

Accidents in the Construction Industry

Report of Survey made during 1966



LONDON: HER MAJESTY'S STATIONERY OFFICE

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* Unless otherwise stated statistics relate to the period from 1st January 1966 to 30th June 1966 and cover the survey area by code number (see Appendix 2 for list of code numbers allocated to sites or groups firms).

Accidents in the Construction Industry

To the Right Hon. R. J. GUNTER, M.P.,
Minister of Labour.

Sir,

I have the honour to present to you a report on the accident position in the construction industry based on enquiries made on selected sites during 1966.

The enquiries were undertaken at your direction because of the continued rise in reported accidents in the industry. The detailed arrangements were approved by your Joint Advisory Committee on Safety and Health in the Construction Industries.

The enquiries were carried out by two experienced members of H.M. Factory Inspectorate. They covered 12 large sites, a group of 20 small to medium-sized firms which were members of the same Group Safety Supervisor Scheme and a comparable group of 19 firms with a work load and labour force to balance that of the members of the Group Scheme. The field work began in January 1966 and accident data for the first six months of the year was collected.

The report is a statement of the survey team's findings, supplemented by additional information available at the Ministry's headquarters from other sources. Part I gives a broad indication of the trend of reportable accidents in the construction industry over recent years and sets out the objectives of the enquiries. Part II indicates the types of firms and sites selected and the work method of the investigating team. Parts III to VII set out the results of the inquiries and at the end of each section a brief conclusion has been inserted. There is supporting statistical data in the Appendices.

The conclusions to which the survey team came are of considerable significance to accident prevention work in the construction industry. The report also contains a substantial amount of factual information which the industry should find valuable in considering what more can be done to improve the accident position. In the light of these considerations your Joint Advisory Committee recommended that the report should be published. A preface has been added to enable those concerned to identify easily the conclusions reached and to consider what action might be taken on them. The preface is followed by a summary of the objectives and conclusions of the enquiry.

I should like to thank all those who have been concerned in any way in the preparation of this report.

I am, Sir,

Your obedient Servant,

W. J. C. PLUMBE,

H.M. Chief Inspector of Factories.

Preface

General

The conclusions in the report can be conveniently divided in to three groups, namely, those which, if accepted, would give rise to legislative changes; those which call for action on the part of the industry; and those which are of interest in so far as they add weight or are contrary to commonly held views within the industry on certain aspects of the accident position.

Conclusions which could give rise to legislative changes

The survey team kept 140 sites under surveillance and during the six months ended 30th June 1966, 270 reportable accidents occurred on these sites. According to site records, there were a further 2,900 non-reportable accidents, but only three "near misses". It is doubtful, however, whether most of the employers concerned kept careful records of non-reportable accidents or (even more doubtful) of near misses. In any case, it was impossible in the time available for the survey team to make any investigations or study of the non-reportable accidents. On reportable accidents, it was their opinion that of the 270 reportable accidents, only 50 (19 per cent) could be regarded as clear breaches of Regulations. Their assessment of changes necessary in legislation was, therefore, restricted to the possible inclusion of a requirement about the use of protective clothing to guard against head and foot injuries and a review of the adequacy of regulations 5 and 6 of the Construction (General Provisions) Regulations concerning safety supervisors (conclusion 16(a)).

As regards protective clothing, conclusion 13 is relevant, and it will be remembered that the Commissioner appointed to hold an inquiry with respect to the Draft Construction (Working Places) Regulations and the Draft Construction (Health and Welfare) Regulations considered the provision of safety helmets where there was a danger of being struck by falling objects. He was informed that employers and trade unions were co-operating in the education of workers to use such means of protection, and he joined in the general agreement that more education was necessary before a requirement could be included in legislation. It is doubtful whether the situation has changed sufficiently since the summer of 1965 to justify the inclusion in the Construction Regulations of requirements relating to the provision and the use of safety helmets and safety footwear, but this is a question which both sides of the industry will wish to consider further.

Conclusions which call for action by the industry

The enquiries indicated that about two-thirds of the reportable accidents could be accounted for by faulty methods of work, untidiness of sites and human failure and that there was little evidence that action was being taken by safety organisations to deal with accidents caused by failure of the human factor (conclusions 16(b)(i) and 7). This underlines the importance

of the two matters which are dealt with in conclusions 5(g), 6, 8 and 10(b), and which have been the subject of much consideration and attention in recent years. These are the establishment of an effective safety organisation within each firm and the training of work-people. It is evident from the results of the enquiries, and indeed from the accident position in general, that what has been done in the past is not getting to the root of the problem of accident prevention. The conclusions point to the action which needs to be taken. This includes agreeing a positive safety policy and ensuring that it is known at all levels and at all times (conclusion 6); active management participation and backing of the safety supervisor so that he can play his co-ordinating role in making the policy effective (conclusions 6 and 8); arranging for adequate training of personnel; and dissemination of safety propaganda and information. On the question of training, conclusion 6 points to the need at site agent and foreman level so that site supervisors can ensure that the safety policy is followed, while conclusion 10(b) suggests a need for methods of recruitment and training of new entrants, from labourers upwards, to be considered at industry level. In conclusion 5(g) it is stated that consideration should be given to a wider use of TWI courses.

The report expresses the view in conclusion 5(a) that the safety supervisor has achieved only a small measure of the success which might be expected from the legal requirements. In some cases, safety supervisors lacked detailed knowledge of safety legislation and in some cases they had insufficient background knowledge of the industry. On some large sites the safety supervisor had insufficient time to carry out his duties effectively. The conclusion ends with a recommendation that the industry should undertake a comprehensive reappraisal of the status, functions and conditions of employment of safety supervisors. In addition, conclusion 8 refers to the effectiveness of the Group Safety Supervisor Scheme surveyed and suggests that consideration should be given to the appointment of site safety supervisors on large sites.

Too often little attention is given to the dissemination of safety propaganda and information and conclusion 5(g) points to the lack of support given by managements in many cases to safety supervisors' efforts in this direction and to the lack of information about availability of propaganda material. Conclusion 16(b) suggests that consideration should be given to a greater use of leaflet-type publications dealing with particular safety problems, and in particular to the publication by the industry of its own safety journal. Conclusion 5(h) emphasises the considerable interest in safety problems among trade union district officials but states that trade union participation at site level was limited. The effectiveness of a well organised site safety committee is brought out in conclusion 5(f).

Other items which relate essentially to action which might be taken by the industry itself appear in conclusions 1, 2, 5, 11 and 14. Conclusion 1 points to a special need to deal with the problem of site tidiness in the early stages of a contract, while the problems of failure to use the experience of safety supervisors at the planning stage of a project and failure to ensure that plans for safe working are followed on the site are mentioned in conclusions 5(b) and 5(e). Conclusion 5(d) relates to the need, particularly

on the smaller sites, to improve the competence of persons undertaking particular inspections under the Construction Regulations. Difficulties in controlling the activities of work-people employed by sub-contractors where they are present in very small numbers or individually on sites, and in securing effective safety measures where a number of contractors and sub-contractors have employees working in a relatively small and sometimes confined area, are referred to in conclusion 11. These are mainly organisational matters which merit special study, since satisfactory solutions are not so easily identifiable as in the case of conclusion 2, which calls for the provision of artificial lighting at the earliest possible stage, and conclusion 14, which recommends that where industrial health schemes are in existence employers should be encouraged to join them.

Other conclusions

There is a further group of conclusions which do not lead directly to suggestions for action but which are individually of interest. Typical of the group are conclusions 3 and 4, in which it is stated that improvement in the standard of reporting of accidents had a substantial effect on the increase in the number of accidents reported from sites in 1964, but its effect decreased in 1965; and that workers are now better able financially to withstand necessary periods of absence from work which will ensure full recovery from injury—this could be a factor in the rise in the total number of reportable accidents in recent years.

Conclusion 9 indicates that, on average, while there were exceptions, smaller firms had a lower accident incidence rate than larger firms and their sub-contractors. Less decisive views are to be found in conclusion 10(a), in which the survey team say that there was no conclusive evidence to relate the incidence of accidents to labour turnover, although the efforts of some contractors who attempted to instruct inexperienced employees on site hazards tended to be nullified by high labour turnover; in conclusion 12 which says that the sample of self-employed labour-only sub-contractors visited by the team was too small to draw general conclusions; and in conclusion 15, in which the team point to the difficulty they experienced in assessing the extent to which full compliance with legal requirements would have modified the accident position. About one-fifth of the accidents could probably have been prevented had there been full compliance with statutory requirements, but it was impossible to say how many accidents were avoided as a result of observance of Regulations.

A summary of the objectives of the survey and the conclusions reached

OBJECTIVES	CONCLUSIONS
<p>To ascertain:</p> <p>(1) The extent to which certain types of accident and their frequency could be linked with particular phases of activity on the site.</p> <p>(2) Whether the time when an accident took place was relevant e.g. during overtime, when work was behind schedule, week-end working or winter working.</p> <p>(3) How far the standard of reporting accidents was responsible for an increase of accidents on sites.</p> <p>(4) Information on any trend for minor injuries to become reportable ones.</p>	<p>(1) More accidents were reported from contracts which were in their early stages. In these circumstances site conditions were often at their worst and gave rise to a greater number of accidents due to falls and foot punctures. Site tidiness is a major factor in accident prevention and in the opinion of the inspectors if every site were tidy there would be a significant reduction in the accident figures (para 40).</p> <p>(2) There was no conclusive evidence that the time of day or the day itself influenced the number of accidents. More attention could, however, be given to the provision of artificial lighting at the earliest possible stage (para 45).</p> <p>(3) Improvement in the standard of reporting of accidents had a substantial effect on the increase in the number of accidents reported from sites in 1964 but its effect decreased in 1965 (para 61).</p> <p>(4) Workers are now better able financially to withstand necessary periods of absence from work which will ensure full recovery from injury. This could be a factor in the rise in the total number of reportable accidents in recent years (para 56).</p>

OBJECTIVES—continued

(5) How safety was organised on the site including:

(a) suitability and competence of the safety supervisor;

(b) the stage at which safety considerations entered into the planning of the work e.g. by prior consultation with the safety supervisor;

(c) the role of the foreman;

(d) the effectiveness of competent persons;

(e) use made of technical staff to deal with the more complex safety matters;

CONCLUSIONS—continued

(5)

(a) The safety supervisor has achieved only a small measure of the success which might be expected from the requirements of regulations 5 and 6 of the Construction (General Provisions) Regulations 1961. In some cases safety supervisors lacked detailed knowledge of safety legislation and in some cases they had insufficient background knowledge of the industry. On some large sites the safety supervisor had insufficient time to carry out his duties effectively. The industry should undertake a comprehensive reappraisal of the status, functions and conditions of employment of safety supervisors (paras 82, 157 and 159).

(b) Some potentially dangerous situations could be avoided and accident prevention problems eased if greater use were made of the experience of safety supervisors at the planning stage of a project (para 128).

(c) There was evidence that some site foremen and agents did not possess a good working knowledge of statutory requirements (para 204).

(d) On the larger sites the duties of competent persons undertaking inspections under the Regulations were carried out to a reasonable standard. On the smaller sites the standard varied considerably and examples were found of employees whose competency left much to be desired carrying out statutory inspections. It is a desirable principle that men should not undertake a statutory inspection of their own work (para 122).

(e) There was some evidence that top technical staff were used in planning for safety, but the safety aspects of this planning may be nullified by subsequent action on site (para 125).

(f) the use of site safety committees ;

(g) training undertaken for supervisory staff and operatives ;

(h) the extent of trade union participation.

(6) The measure of success in preventing accidents achieved by the safety organisation. Insofar as it failed, the reasons for failure.

(7) How far the safety organisation attempted to deal with classes of accidents resulting from causes not covered by legal requirements i.e. accidents caused by failure of the human factor rather than by failure to produce safe environmental conditions.

(f) A well-organised site safety committee can provide the necessary co-ordinating role on a site with a number of contractors and sub-contractors. It needs to be led effectively and a system evolved for ensuring that its recommendations are carried out (para 139).

(g) The position regarding safety training and safety propaganda on sites was not very encouraging. Safety supervisors usually had a desire to organize training and to devise schemes to put out propaganda aimed at safe working methods but they received little support from management in many cases. Many of them were not well informed about the methods of obtaining propaganda material. Consideration should be given to a wider use of TWI courses for improving site supervision (para 146).

(h) There was considerable interest in safety problems amongst trade union district officials but trade union participation at site level was limited (para 150).

(6) The effectiveness of safety organisations varied considerably and all of them, even the best, could have been improved. The key to the situation is undoubtedly a positive safety policy, the appointment of an effective safety supervisor and the backing he receives from management, followed by adequate training at site level starting with site agents and foremen (paras 155 and 156).

(7) There was little evidence that action was being taken which would reduce the large number of accidents which fall into this category (para 158).

OBJECTIVES—continued

(8) Whether any reasons could be found for differences in safety performance as between comparable sites.

(9) The existence of any evidence to show whether smaller firms have a similar accident incidence rate to larger firms.

(10) The effect on the incidence of accidents and on safety training and propaganda of:

(a) rapid labour turnover;

(b) engagement of inexperienced workers.

(11) The effects of a multiplicity of sub-contractors on site with particular reference to co-ordination of safety measures.

CONCLUSIONS—continued

(8) The differences in safety performance between comparable sites could be related in some cases to the extent to which senior management actively participated in the safety organisation. On the larger survey sites where the accident incidence rate was above average the safety supervisor often had insufficient time to perform his duties effectively. Where there is a large labour force on site, consideration should be given to the appointment of site safety supervisors. For small and medium-sized firms membership of a well organised Group Safety Supervisor Scheme can provide a satisfactory solution (paras 82, 83, 94, 95 and 109).

(9) Evidence available indicated that, while there were exceptions, on average smaller firms had a lower accident incidence rate than larger firms and their sub-contractors (para 154).

(10)

(a) There was no conclusive evidence to relate incidence of accidents to labour turnover but the efforts of some contractors who attempted to instruct inexperienced employees on site hazards tended to be nullified by high labour turnover (para 163).

(b) Over half of the reportable accidents on survey sites occurred to persons with less than twelve months site experience. Methods of recruitment and training of new entrants from labourers upwards, need consideration at industry level (para 167).

(11) There is difficulty from a safety point of view in controlling the activities of work-people employed by sub-contractors where they are present in very small numbers or individually on sites. Effective basic training of such employees in safety measures is essential. Additionally special action is necessary to keep a

constant check on safety measures on sites where a number of contractors and sub-contractors have employees working in a relatively small and sometimes confined area—an initial step could be to make one contractor responsible for co-ordinating safety in that area (paras 175-6).

(12) The sample was too small to draw general conclusions. On the survey sites there were no accidents to self-employed labour-only sub-contractors which caused them to be absent for more than three days and these sub-contractors did not cause accidents to employed persons (para 181).

(13) Many accidents might have been prevented if safety helmets and protective footwear had been worn. With one exception propaganda and persuasion on the sites had failed to secure the use of protective headgear. In the one case there was evidence that safety helmets would be worn if particularly dangerous areas were identified and within these areas the wearing of helmets made compulsory (para 189).

(14) It was generally found that the facilities for immediate first-aid treatment on the sites were adequate. Whilst the provision of good facilities for the subsequent treatment of injury will not reduce the number of accidents occurring on site, such facilities can affect the amount of time lost after an accident. Where industrial health schemes are in existence the team considered that employers should be encouraged to join (para 197).

(15) It is extremely difficult to assess the position. About one-fifth of the accidents could probably have been prevented had there been full compliance with statutory requirements but it is impossible to say how many accidents were avoided as a result of observance of Regulations (para 198).

(12) The effect of the self-employed labour-only sub-contractor system on safety.

(13) The value of protective clothing in accident prevention.

(14) The effectiveness of first-aid facilities on site.

(15) The extent to which full compliance with legal requirements would have modified the accident picture.

OBJECTIVES—continued

(16) An assessment of compliance with statutory requirements and the need for fresh remedial measures such as:

(a) the introduction of new Regulations or the strengthening of existing Regulations ;

(b) self-help by individual firms or the industry as a whole.

CONCLUSIONS—continued

(16) The team assessed the standard of compliance with legislation as average and in some cases above average yet there were 270 reportable accidents. As regards fresh remedial measures the team considered that

(a) further legislation may be necessary to require the use of protective clothing to guard against head and foot injuries. There is need for a review of the adequacy of regulations 5 and 6 of the Construction (General Provisions) Regulations 1961 concerning safety supervisors (para 202).

(b)

(i) action is necessary by the industry to deal with accidents caused by faulty methods of work, site tidiness and human failure which together accounted for two-thirds of the reportable accidents (para 202).

(ii) knowledge of the Construction Regulations was found to be limited. It is vitally important that site supervisors should have a thorough knowledge of legislation and that higher management should be willing to take notice of the advice of their safety supervisors. Consideration should be given to a greater use of leaflet type publications dealing with particular problems and to the publication by the industry of its own safety journal (para 206).

Report on the Accident Position in the Construction Industry based upon enquiries made by Mr. W. Brittain-Jones and Mr. D. G. Whomsley

PART I INTRODUCTION

1. The decision to carry out detailed enquiries into accident causation on construction sites was taken by the Minister of Labour, following discussions with representatives of the Trades Union Congress about the continued rise in accidents amongst workers in the industry which had been particularly marked during 1964. The following figures of accidents occurring on construction work and reported to HM Factory Inspectorate* during the years 1960-1965 indicate the full extent of this rise.

	Total accidents reported	Fatalities included in column 1	Operatives† employed in thousands	Approximate† value of output at 1958 prices £ million
	(1)	(2)	(3)	(4)
1960	20,584	277	1,432	2,548
1961	23,356	264	1,481	2,734
1962	25,338	281	1,472	2,748
1963	28,348	242	1,448	2,737
1964	40,491	271	1,503	3,088
1965	44,381	230	1,491	3,146

As will be seen from Appendix 1 to this report the rise in accidents relating to construction processes was greater than that for other sections of industry subject to Factories Act legislation. Using 1960 as base 100 the index for construction reached 215.6 in 1965 compared with 148.1 for factory processes.

2. In reaching the decision to make these enquiries full consideration was given to the difficulty in interpretation of yearly fluctuations in the figures because of variations in the standards of reporting accidents. A survey made in 1962 (referred to in HM Chief Inspector's Annual Report 1963 at page 20) in conjunction with the Ministry of Pensions and National Insurance suggested that 38 per cent of reportable accidents in factories had not been reported to the Inspectorate and within the limited sample available, the construction industry probably reported a little less than 50 per cent of reportable accidents. As a result the Department took

* An accident in premises subject to the Factories Act 1961 is reported to HM District Inspector of Factories if it causes loss of life or disables any person for more than three days from earning full wages at the work at which he was employed. The figures shown in paragraph 1 above are the national total of such accidents reported for construction processes.

† Source—Ministry of Public Building and Works Statistical Series.

measures designed to remind employers of their legal responsibilities regarding accident notification and in the construction industry all employers received an appropriate communication in April 1964. A further survey carried out in April 1964 showed some improvement in reporting standards in factories but little or no improvement amongst construction firms. It is not unreasonable to assume that there has been an improvement since that date as a result of the April 1964 communication.

3. Apart from the probable improvement in reporting standards there have also been fluctuations in the number of workers at risk and in the total man-hours worked. The effects of these factors are less marked in frequency rates which are calculated from returns supplied voluntarily by a number of firms in which they give figures of man-hours worked and all "lost-time" accidents. The latter are those which cause loss of time from the work on which the injured person was employed extending beyond the day or shift on which the accident occurred. The firms making the sample vary from year to year and, in order that the rates may be strictly comparable, only returns from the firms submitting figures in both the current and preceding years are used in the calculation. A time series cannot therefore be calculated. Unfortunately, whereas returns from manufacturing industry cover about 40 per cent of the labour force, only 12½ per cent of the construction industry labour force is covered by these voluntary returns. The figures for 1964 compared with 1963, and 1965 compared with 1964 are given below and indicate not only a rising trend for the construction industry but also a steeper rise than for industry as a whole.

Frequency rates (number of accidents per 100,000 man-hours worked)

<i>All industries</i>		<i>Construction</i>	
<i>1963</i>	<i>1964</i>	<i>1963</i>	<i>1964</i>
1.93	2.14	2.75	3.03
<i>1964</i>	<i>1965</i>	<i>1964</i>	<i>1965</i>
2.17	2.33	3.14	3.50

4. Proposals for carrying out the enquiries were referred for consideration to the Joint Advisory Committee on Safety and Health in the Construction Industries. The first six months of 1966 were selected as a suitable period for the work to be undertaken and it was agreed that apart from trying to establish the reasons for the apparently worsening situation the intention should be, if possible, to throw new light on accident causation and preventive measures. It was decided that this was most likely to be achieved by an intensive study of a relatively small section of the industry and that two members of HM Factory Inspectorate, who were to be detached from their normal duties for the purpose, should be allocated a number of sites and firms, both large and small, within a defined area. The Inspectors' enquiries were to be directed to providing the following information:

- (1) The extent to which certain types of accident and their frequency could be linked with particular phases of activity on the site.
- (2) Whether the time when an accident took place was relevant e.g. during overtime, when work was behind schedule, weekend working or winter working.

- (3) How far the standard of reporting accidents was responsible for an increase of accidents on sites.
- (4) Information on any trend for minor injuries to become reportable ones.
- (5) How safety was organised on the site including :
 - (a) suitability and competence of the safety supervisor ;
 - (b) the stage at which safety considerations entered into the planning of the work e.g. by prior consultation with the safety supervisor ;
 - (c) the role of the foreman ;
 - (d) the effectiveness of competent persons ;
 - (e) the use made of technical staff to deal with the more complex safety matters ;
 - (f) the use of site safety committees ;
 - (g) training undertaken for supervisory staff and operatives ;
 - (h) the extent of trade union participation.
- (6) The measure of success in preventing accidents achieved by the safety organisation. In so far as it failed, the reasons for failure.
- (7) How far the safety organisation attempted to deal with classes of accidents resulting from causes not covered by legal requirements, i.e. accidents caused by failure of the human factor rather than by failure to produce safe environmental conditions.
- (8) Whether any reasons could be found for differences in safety performance as between comparable sites.
- (9) The existence of any evidence to show whether smaller firms have a similar accident incidence rate to larger firms.
- (10) The effect on the incidence of accidents and on safety training and propaganda of :
 - (a) rapid labour turnover ;
 - (b) engagement of inexperienced workers.
- (11) The effects of a multiplicity of sub-contractors on site with particular reference to co-ordination of safety measures.
- (12) The effect of the self-employed labour-only sub-contractor system on safety.
- (13) The value of protective clothing in accident prevention.
- (14) The effectiveness of first-aid facilities on site.
- (15) The extent to which full compliance with legal requirements would have modified the accident picture.
- (16) An assessment of compliance with statutory requirements and the need for fresh remedial measures such as :
 - (a) the introduction of new Regulations or the strengthening of existing Regulations ;
 - (b) self-help by individual firms or the industry as a whole.

A summary of the brief and the corresponding conclusions are to be found immediately after the preface to the Report.

PART II SELECTION OF FIRMS AND SITES AND WORK METHOD OF INVESTIGATING TEAM

5. The sites visited were situated within the boundaries of two divisions of HM Factory Inspectorate which were selected because they offered a suitable cross-section of the industry, including both city and urban development, without the Inspectors having to spend too much time in travelling from site to site. There were also several power stations under construction and it was possible to select two such stations which were at different stages of development and yet were sufficiently close to one another to experience the same climatic and labour problems.

6. Twelve large sites were chosen and these are briefly described below. In certain cases it was thought advisable to select sites where similar operations were being carried out so providing a means of comparing accident records. In other cases, similar sites but at different stages in their development were chosen so that an assessment of the varying hazards at different stages of the contract might be attempted.

(1) A power station in the early stages of construction—average numbers employed 1,650.

(2) A power station in the later stages of construction—average numbers employed 2,069.

(3) A large development programme for a local authority including houses, flats, bungalows and shops in middle/late stages of construction—average numbers employed 160.

(4) A speculative housing site, comprising 312 dwellings in the middle stages of completion—average numbers employed 38.

(5) An office block in the early/middle stages of construction—average numbers employed 97.

(6) Five blocks of multi-storeyed system built flats for a local authority in the early/middle stages of construction—average numbers employed 82.

(7) A large development programme for a local authority consisting of multi-storey and four-storey blocks of flats in early/middle stages of construction—average numbers employed 250.

(8) Private redevelopment including a new multi-storey block of flats in the middle/late stages of construction—average numbers employed 402.

(9) A section of a road in the early/middle stages of completion—average numbers employed 330.

(10) A section of a road in the middle/late stages of completion—average numbers employed 511.

(11) A large sewerage scheme in the middle stages of completion—average numbers employed 45.

(12) The demolition and reconstruction of parts of an existing large factory in the middle/late stages of completion—average numbers employed 86.

7. The Joint Advisory Committee on Safety and Health in the Construction Industries was particularly anxious that the enquiries should be extended to small firms and accordingly a group of 20 was chosen comprising small

to medium sized contractors who were members of a Group Safety Supervisor Scheme. For comparison purposes a second group of smaller firms was selected to balance the numbers employed and the workload of the contractors forming the first group. Although it was subsequently found that several of the firms in the comparable group either employed the same safety consultant or were in other group safety schemes, they had generally no common relationship one with the other or with the members of the selected Group Safety Supervisor Scheme. To complete the picture a study was made of the work undertaken on a direct labour basis by a local authority.

8. It is emphasised that the enquiries were not intended to and do not in fact provide information of a statistically representative character about the incidence of accidents. Nevertheless, where it is possible to make comparisons with national figures it will be seen that the survey area has produced remarkably similar results.

9. All the main contractors concerned were visited in the initial stages of the survey and the purposes of the enquiries explained. The heads of firms were given an assurance that the identity of their companies would not be disclosed in the subsequent report. Accordingly all statistical data and comment, where appropriate, will be referred to by means of code numbers (see Appendix 2). Quite apart from needing access to accident records, the investigating team were interested in "near misses" which could have caused injury to work-people and employers were asked to keep a record of such happenings for the information of and subsequent investigation by the Inspectors. The team was interested in any accidents which occurred between the 1st January 1966 and 30th June 1966 and as these were notified, no matter how trivial the accident appeared to be from the information noted on the report form, investigation was carried out on site. The team sought in the first instance to discover the circumstances of the accident and this was done by interviewing the site supervisory staff together with any witnesses available. Particular attention was paid to the type of work being carried on when the accident occurred and the particular stage of the work which had been reached. A careful note was also made of the time of the accident and the state of the weather. Whenever possible, once the circumstances of each accident were known, the injured person was interviewed in an attempt to discover whether there were any factors involved in the accident which had not been immediately apparent. The severity of the injury was checked and the length of absence from work verified. Additional information was sought on the injured person's experience in the industry and on any previous accidents, reportable or not, which he had sustained at work. The injured person was always informed that the interview was of a confidential nature and he was encouraged to discuss any other social or domestic factors which might have had a bearing on his accident. When the investigation into the circumstances of the accident was finally completed the team assessed whether in their view the accident had been primarily caused by a failure to comply with statutory requirements. Whether this was the case or not, attention was paid to any action which had been taken to prevent the recurrence of the accident.

10. In order to minimise the bias which was likely to arise once supervisory staff realised that their sites were to be subjected to frequent scrutiny, particular note was taken during initial visits to all sites at the beginning of the survey of the amount and condition of plant and scaffolding in use. The tidiness of the site was also taken into account and an attempt made to assess the various types of hazard to which the persons employed would be subjected. Site records were scrutinised, particularly those referring to plant and scaffold inspections. Finally the site supervisory staff and, where applicable, the contractors' safety supervisors were interviewed and a careful note made of the impressions gained at these interviews. Failures to comply with the statutory requirements noted at these initial visits were drawn to the attention of the site supervisory staff.

11. Subsequently periodical visits were made to each site to observe general site conditions. The intervals between visits varied from site to site. With some of the larger sites more frequent visits were necessary, firstly because they were in a greater state of flux and secondly because as a general rule they reported more accidents. Wherever possible an attempt was made to divorce visits when general observations were carried out from visits paid to investigate accidents but there were occasions when it was found convenient to combine both. At these subsequent visits attention was paid to the progress in the work, to any improvement in site conditions and to compliance with statutory requirements. Supervisory staff in particular were encouraged to discuss any difficulties which had arisen, for example, because of weather conditions, a shortage of material or an influx of sub-contracting labour. The investigating team spoke to employees including those classed as competent persons who had duties under the Regulations. In every case the site accident register (BI 510) was examined. In this way the team gained some impression of the number and type of minor non-reportable accidents that were occurring on site and were also able to keep some check that accidents disabling men for more than three days were being reported.

12. In order to gain as wide an impression as possible of the current opinion within the industry about safety matters the team also held informal meetings with site agents, foremen, workers' representatives at site and district level and representatives of the employers' federations. An attempt was made to discover what contribution each interested party was making to accident prevention and whether, in fact, this contribution was adequate.

PART III ACCIDENTS

General

13. During the period of the enquiries there were 270 reportable accidents. Three of these accidents were fatal. This part of the report analyses these accidents against the background of legislation, causation, site conditions, occupation, time of occurrence, severity of injury and length of absence. The extent to which any of these factors might affect the rise in the number of reported accidents is mentioned in the narrative related to each factor. There is a final section dealing with standards of reporting.

14. It had been hoped to include some information on non-reportable accidents (those causing absence from work of three days or less) and on "near misses" which involved damage to plant but no physical injury. Site records showed that there were 2,900 non-reportable accidents but only three "near misses". It is doubtful whether employers generally kept careful records of these cases but in the event it was impossible in the time available to make any investigations or study of the non-reportable accidents. Of the three "near misses" reported two concerned methods of slinging and the third arose from spillage of acid from a split plastic carboy.

15. The survey team found that within the Group Safety Supervisor Scheme and the comparable group (code Nos. 13 and 14) 31 firms each employing less than 100 work-people had 29 of the 270 reportable accidents. Nineteen of these firms did not have one reportable accident during the survey period. On the other hand the remaining eight firms within these two groups (each employing over 100 work-people) also had 29 reportable accidents so that the 58 accidents were divided equally between eight large firms and 31 small firms. Differences in the accident incidence rate between large and small firms are discussed in paras 151-154.

16. The survey team were required to assess the position they found on sites taking into account current legislation and in particular to consider which accidents could have been avoided had there been full compliance with regulations. They found as indicated in Appendix 5 that 50 accidents (19 per cent of the total of 270) could have been avoided had there been full compliance with the statutory requirements. In the remaining 220 accidents the inspectors were of the opinion that there was no breach of the regulations.

17. Of the 50 accidents which, in the opinion of the survey team, could have been avoided had there been full compliance with statutory requirements, 12 were classified as severe and 38 as moderate. A description of the breaches is given below—

Breach connected with—	Number
Unsafe means of access at ground level including those giving rise to accidents caused by nails entering the feet	27
Holes in roofs and floors and falls through open joisting	5
Scaffold deficiencies	4
Failure of lifting machinery	2
Failure of persons to operate plant safely	2
Unsafe means of access at a height	2
Failure to use lifting gear safely	1
Guarding of dangerous machinery	1
Use of ladders	1
Timbering of excavations	1
Protection of eyes	1
Protection from falling material	1
Lifting excessive weights	1
Maintenance of site transport	1

The figures suggest that sufficient attention is still not being given to means of access.

Causation

General

18. As is shown by the following figures for the construction industry over the past ten years the proportion of accidents due to persons falling has only improved marginally in relation to other hazards during this period. The fact that falls remain one of the principal hazards is borne out by the number of accidents due to this cause which have more than doubled during this period and the high number of fatalities included. The percentage due to handling has, however, increased from 20 per cent to over 26 per cent in the last ten years and there has been a small but steady rise in accidents due to striking against objects, offset by small improvements in the categories described as being struck by falling objects, hand tools and transport.

Reportable accidents in the construction industry

	1965		1960		1955*	
	Total	%	Total	%	Total	%
Persons falling	11,914 (111)	26.8	6,322 (151)	30.7	4,927	29.7
Handling	11,645 (2)	26.2	4,135 (1)	20.1	3,205	19.3
Striking against objects	5,159 (1)	11.6	2,220 (—)	10.8	1,609	9.7
Struck by falling object	3,534 (43)	8.0	2,039 (49)	9.9	1,769	10.7
Machinery	3,448 (37)	7.8	1,724 (25)	8.4	1,257	7.6
Hand tools	3,375 (—)	7.6	1,696 (—)	8.2	1,524	9.2
Transport	2,880 (22)	6.5	1,237 (28)	6.0	1,178	7.1
Others	2,426 (14)	5.5	1,211 (23)	5.9	1,104	6.7
Total	44,381 (230)	100	20,584 (277)	100	16,573 (223)	100

Note: Fatalities are shown in brackets.

* A breakdown of fatalities for this year is not available.

19. Details of accidents reported from all selected sites during 1965 were collected and their causations analysed so that they could be compared with those reported during the period of the survey. The results of this exercise did not, however, show any particular trend or reveal new hazards. Appendix 6 analyses by primary cause the accidents which took place in the survey area during the period of the survey; it also gives comparable national percentages. Appendices 7 to 10 show similar figures analysed by causation according to hazard and to process. There were no accidents of special significance concerning hand tools or transport. Hand tools accounted for 14 accidents (5.2 per cent of the total compared with 7 per cent nationally for the same period) and transport for 19 (7 per cent against a national percentage of 6.7 per cent). Other groups of accidents are commented on separately in the paragraphs which follow.

20. Within the survey area 56 accidents (20.8 per cent) were due to falls of persons, compared with the national percentage for the first six months of 1966 of 27.2 per cent. Thirty-two of the accidents were caused by persons falling from one level to another other than from ladders and of these

20 involved falls of under 6 ft. 6 in. A further 19 were due to falls on the same level. Of twelve accidents involving falls of over 6 ft. 6 in. (excluding falls from ladders) five resulted in serious injuries and one of the workers subsequently died. The following description of these accidents helps to illustrate that they could have been prevented had the workers concerned exercised better judgment and taken more care for their own safety. An electrician was fatally injured when he fell 57 ft. through the incomplete open tread flooring of a lantern staircase in the boiler house of a power station which he elected to use instead of the safe access provided. A plumber was carrying out maintenance work on the roof of a building with a pitch of about 40 degrees. He was working from a crawling ladder with the block secured behind a ridge tile. The ridge tile gave way and the man fell a distance of 20 ft. to the ground. A joiner was engaged on shuttering work on a cast in situ concrete column 10 ft. high. Although a mobile tower scaffold was available he chose to climb up the column cramps. One of the cramps gave way and he fell. A labourer sent to cover roof light openings in the flat roof of a school under construction fell 9 ft. through one of them. Lastly a roof worker fell 30 ft. whilst erecting guard-rails round the sides of a platform of a mobile tower scaffold. The guard-rails had been previously dismantled so that the tower could be moved.

21. Five of the 56 falls were from ladders. Three men slipped from the first or second rungs of the ladder because their boots were covered with mud. One man fell 15 ft. because his ladder was unsecured and slipped, while another man received fatal injuries when he fell from a 4 ft. high step ladder which was in good condition.

Handling and striking against objects

22. Accidents arising from handling and lifting accounted for 26.3 per cent (71 accidents) which was a similar percentage to the national average for the first six months of 1966. Typical examples of these were a poisoned hand from cutting wire; a strained hand while lifting a heavy duty battery; a strained back while loading a lorry; a strained back while fixing a spacing piece on shuttering; a broken toe due to dropping a piece of scaffold on it; and a strained groin while lifting concrete cladding.

23. Stepping on or striking against objects accounted for 15.9 per cent (43 accidents). This percentage was higher than the national figure of a little under 12 per cent and the problem of accidents arising from stepping on objects is discussed in paras. 185-188 of the report.

Struck by falling objects

24. The sites under survey produced 24 accidents (8.9 per cent) which had been caused by being struck by falling objects. The percentage was almost identical to that for the country as a whole. Fifteen of these occurred because objects propped up or stacked at ground level fell over or because employees dropped things on their own feet. Five of the remaining nine accidents involved materials falling from a height of over 15 ft. In one case a scaffolder dropped a turn buckle which fell 18 ft. In another a chimney hand lost his grip on a metal shutter which fell 70 ft. inside the chimney. The shutter fortunately hit a number of obstructions on its way

down and its fall was arrested. An unusual accident occurred when an employee at ground level on a site under survey was struck by a shutter blown by the wind from an adjacent site. The use of safety helmets and safety footwear is considered in Part VI of the report.

Machinery

25. A number of accidents classified under this heading (20 accidents—7·4 per cent compared with 7·7 per cent nationally) involved the use of lifting machinery. The majority of the accidents were due to persons being struck by the load but of the remainder two are of special interest in that they could have resulted in more serious injuries than those actually sustained. One concerned a fitter who was changing a grease nipple on the hoist drum of an excavator. The work was being done with the machine motor running. The fitter slipped and accidentally engaged the hoist clutch gear with the result that his hand was trapped and he cracked a bone in the hand. The other occurred on a mobile crane which had been adapted for use as a travelling scaffold, a fully protected platform having been fitted to the top of the telescopic mast. A man sustained a fractured ankle when the hoist rope broke and the platform fell 15 ft. before the arrester gear came into operation.

Conclusion

26. A study of the causes of the accidents arising during the survey showed that the sites produced in most cases very similar types of accidents to those shown in the Construction Tables in HM Chief Inspector's Reports. Although the proportion due to persons falling was less marked on the survey sites and suggests that on those sites at least employers and work-people were taking positive steps to try to reduce the hazard, nevertheless, the problem of falls remains a serious one and must be given constant attention. (The use of protective clothing to prevent injuries due to stepping on or striking against objects or to being struck by falling objects is dealt with in Part VI of the report.)

Site conditions

Effect of weather

27. Since the survey was carried out during the first six months of the year, the team had the opportunity of observing the effect of differing weather conditions on the selected sites. It was found that the weather was the major contributory cause in 19 of the 270 accidents and that it played a smaller part in a number of others.

28. The wet weather generally experienced over the area during the first two months of the year had an effect on the sites which were in the early stages of their development. On such sites, especially where service roads or other hard means of access had been left to a later stage in the contract, the ground turned into a sea of mud which not only increased the hazard of slipping but also obscured other potential hazards such as holes in the ground and pieces of timber with protruding nails.

29. Eleven accidents occurred which could be attributed to the wet weather. In three cases labourers were climbing ladders carrying materials after walking across particularly muddy sites. In two other cases excavator drivers slipped

from the tracks of their machines whilst attempting to get out of the driving cabs. The tracks were coated with mud and rain was falling at the time of both accidents. There were four falls on the level which could only be attributed to the wet conditions under foot. A tenth accident involved the partial collapse of the side of a trench. The collapse occurred soon after a period of heavy rain and it was clear that water draining into the trench had washed away a pocket of sand behind a clay face causing the face to slip. The last accident which could be directly connected with wet weather was unusual but interesting. An employee had been accustomed to lifting lagging panels of a certain size and weight. On the occasion of the accident the panels had been left out in the rain and had absorbed a considerable amount of moisture. The subsequent increase in weight and the fact that the employee was unaware of this, caused him to strain his back as he attempted to lift the first wet panel.

30. Three accidents could be directly attributable to frost and ice. Two employees slipped on patches of ice and fell. In the third case a labourer was attempting to build up a stack of breeze blocks on frozen rutted ground. Because of the rutted nature of the ground he found it difficult to make the stack stable and finally a portion of it fell on to him. From a study of the site records of minor accidents which occurred during the winter months, the greatest hazard from frost and ice seemed to be that of stumbling on ground which had been previously churned up and which had become hard and rutted under the action of the frost. It was generally found that where working platforms or scaffolds were affected by frost and ice, work was suspended until conditions improved.

31. Five accidents were reported when men had been struck by objects blown by the wind. In four cases pieces of timber of varying size were involved. In the fifth, a prefabricated panel of a large site office under construction was blown over. There was a general awareness of the dangers of working on lofty structures such as cooling towers and chimneys during high winds and a reluctance to expose employees to these dangers when wind speeds became excessive.

32. There was no evidence to suggest that noise was a contributory factor in any of the 270 reported accidents.

Site tidiness

33. The standard of tidiness on sites varied considerably. On some sites the poor standard was due solely to the complete lack of organisation by the supervisory staff and on others to the confined nature of the site itself. In the latter cases there is no doubt that a problem exists when a site has to be developed in a built-up area where land is at a premium and the only space available is taken up by the structure itself. Nevertheless, there were sites like these where the problem had been faced and a good standard of tidiness attained purely by the organisation and efforts of the site supervisory staff.

34. Forty-three of the 270 accidents reported were caused by persons stepping on or striking against objects. Sixteen of these accidents occurred at a large site during the early stages of construction, a site where the standard of tidiness left much to be desired. Two housing sites of similar size were also compared. One reported no accidents and site tidiness was always good.

On the other site, where there was ample space available, materials were strewn rather than stacked. There were no recognised means of access. Two reportable accidents and a number of minor ones were directly caused by persons tripping over obstructions of varying sizes on site.

35. Sixteen reported accidents (1 in 17 of the total reported) were caused by persons stepping on pieces of timber with protruding nails and many of these could have been avoided by better site tidiness. In two cases, attempts had been made to gather up all the dangerous pieces of timber into a pile and accidents occurred because employees attempted to take a short-cut across the piles. Apart from the reportable accidents the minor accident records showed that a large number of people had been injured by stepping on nails but had not been disabled by their injuries. Nationally in 1965 nearly 2,000 or 1 in 22 of reported accidents were due to this cause.

36. Sites 1, 5, 6, 7 and 9 which were in the early/middle stages of development accounted for 114 (i.e. 56 per cent) of the 204 reportable accidents on the twelve large sites. These five sites employed 42 per cent of the labour force concerned. The accidents included those caused by lifting and erecting shuttering, stepping on protruding nails, stepping on or knocking against projecting or protruding reinforcing steel and tripping or stumbling. At this stage of the contract site conditions are likely to be affected by the weather and site hazards increase when no early provision is made for proper means of access and materials storage. The sites which were in the middle or middle/late stages of development did not produce so many accidents although the later stages of the contract work is usually being carried out at a height with the consequential greater risk of falling. Usually contracts at the middle or middle/late stages had permanent access ways, materials storage had been improved and there was less risk from the hazard of tripping or stumbling which has already been noted as a major cause of accidents where sites have not been kept tidy.

Industrialised building

37. There were some accidents which occurred on industrialised building sites but none of them could be said to be directly caused by this method of work. The sites concerned were no. 6 and several in the comparable group (no. 14).

38. On site no. 6 where flats were being constructed a tower crane lifted prefabricated concrete sections into place and no outside scaffolding was used. Several of the reportable accidents related to handling, mainly by plumbers, of awkwardly shaped pipes and bath units. Of the others one accident occurred on the clutch mechanism of a digger during maintenance; one involved a fall from first floor to ground level by a foreman, who, during an inspection trod on shuttering loosened for removal; and a third concerned a crane maintenance fitter who was struck on the heel by a crowbar. There were no accidents involving the lifting of sections or the positioning of them. Similarly in the comparable group where three contractors were engaged in building CLASP type schools no accidents related to the method of construction and grouped generally the accidents were strains and sprains.

39. While it is realised that industrialised building methods give rise to special hazards the team did not obtain any evidence of accidents arising from these and because of the limited coverage of this type of erection they are unable to comment constructively on the subject.

Conclusion

40. More accidents were reported from contracts which were in their early stages. In these circumstances site conditions were often at their worst and gave rise to a greater number of accidents due to falls and foot punctures. Site tidiness is a major factor in accident prevention and in the opinion of the inspectors if every site were tidy there would be a significant reduction in the accident figures.

Analysis of accidents according to the occupation of the injured worker

41. Appendix 11 gives a breakdown by trades of the 270 workers who sustained reportable accidents. The survey showed that labourers sustained the largest number of accidents for any particular group. From general observation and from discussion with employees it became clear to the team that a labourer by virtue of his employment was usually more exposed to hazards on site than a tradesman. He was expected to load and unload materials and to carry them to various parts of the site. He was thus liable to suffer strains and the various other injuries associated with handling and striking against or stepping onto objects. He was obliged to climb ladders at frequent intervals to serve the various tradesmen and was thus more liable to fall. Of the five accidents reported which were caused by falls from ladders, four occurred to labourers. There was also the fact that many of the labourers who suffered accidents had little experience in the industry and in a number of cases, because of this inexperience and possibly because of financial reasons, wore the wrong type of clothing for the job they were required to do. It was the labourer's mobility on site, together with his relative inexperience which made him more liable to suffer an accident.

Accidents analysed by time of occurrence

42. Of the accidents investigated two occurred before 7 a.m. and 14 after 5.0 p.m. Sunday work was carried out on a number of the larger sites and produced ten accidents. There was no evidence to suggest, however, that the time of day or the day itself was in any way responsible for the accident.

Winter building methods

43. The survey team saw insufficient use of winter building methods to enable them to reach any conclusions regarding the effect of such methods on accident rates. On the larger sites concrete was protected from frosts and there was the occasional use of polythene sheets and fan heaters. In house building the tendency was to plan so that the tiled shells of a number of dwellings were completed in the autumn leaving interior work for the winter. The team formed the opinion that the comparative lack of winter building methods influenced labour turnover in that the less robust moved from construction sites to factories. Additionally a number of workers were made redundant, mostly the unskilled. The extent to which the absence

of winter building methods leads to rush periods in the spring and summer when accidents are more likely to take place, could be a separate study for the future. In para. 42 however, it is stated that the time of day or the day itself does not appear to influence the incidence of accidents so that the major remaining factor is the rather intangible one of whether too many phases of the work are carried on simultaneously in better weather, when some could have been carried out in the winter months.

Lighting

44. There were no accidents during the period of the survey which could be clearly attributable to inadequate lighting but there were some accidents, mostly tripping and falling, where it is possible that additional lighting might have prevented the occurrences. Lighting was an important factor on the power station sites where work continued during the hours of darkness and two problems arose. The first was failure to report faulty bulbs and the second the difficulty of keeping up with the needs of the many sub-contractors, some of whom were working inside plant fitting instruments, lagging pipes or inspecting welds. On sites connected with the erection of office blocks and public buildings, although work did not continue during the night, early morning, late afternoon and periods of foggy or overcast weather, gave rise to a need for lighting but there was a marked reluctance to provide this until the permanent lighting for the building was installed. These last remarks apply equally to house or school construction but the need was not so great because there was less plant in use and fewer contractors and sub-contractors to clutter the access ways. In contrast road and sewer schemes were comparatively well lit.

Conclusion

45. There was no conclusive evidence that the time of day or the day itself influenced the number of accidents. More attention could, however, be given to the provision of artificial lighting at the earliest possible stage.

Severity

46. The importance of having a unit of measurement of severity of an injury has long been recognised. The reasons may be summarised as follows:

(1) It is necessary as a guide in determining the amount of effort which should be devoted to accident prevention and where those efforts should be directed in order to achieve the best results.

(2) Types of accidents occurring in different industries differ widely in their nature and effect. Accident incidence rates for individual industries do not give a full comparison unless the relative severity of the accidents is also known.

(3) Variations in the severity of accidents can occur which may not be reflected in comparable changes in the incidence rate. Some measure of these changes is necessary in order to assess the effects of accident prevention measures or technical changes which may have taken place.

(4) It would be a useful pointer to the importance of any changes in accident figures.

47. As indicated below, nationally using broad injury groupings, the rates of increase since 1959 of multiple injuries and sprains and strains were greater than those for other types of injury.

Reported accidents—construction processes

Nature of Injury	1959	1965	Percentage Increase 1959 to 1965
Multiples	457	1,294	183
Fractures and dislocations	3,710	7,179	93
Eye injuries	705	1,477	110
Burns (excluding eyes)	320	794	148
Amputations	8,459	235	122
Cuts, abrasions, surface injury and bruises }		18,584	
Strains and sprains	3,632	11,611	220
Not elsewhere specified	1,002	3,207	220
TOTAL	18,285	44,381	143

48. During 1965 an attempt was made by another team who investigated the rise of accidents in factories to devise a formula for the assessment of accident severity by reference to the nature of the injury received. As a result certain injuries were classed as serious while others were classed as moderate. A scale was drawn up as follows :

Severe injuries

Fatalities

Multiple injuries

Amputations

Fractures

Dislocations

Concussion

33 per cent of burns other than multiple burns

20 per cent of eye injuries other than burns

Moderate injuries

Lacerations, cuts

Abrasions and surface injuries

Bruises

Strains and sprains

67 per cent of burns other than multiple burns

80 per cent of eye injuries other than burns

Sepsis

Other

The arbitrary nature of some of these categories such as burns and eye injuries and relatively minor amputations involving for example the tips of fingers is of course obvious. Nevertheless, the 270 accidents reported during the current survey were classified according to this scale and 54 (20 per cent of the total) were shown as severe and 216 as moderate (see Appendix 13). It is of interest to note that using the same scale for the construction industry as a whole 21.5 per cent of the accidents for 1965 were severe.

49. The fatalities apart, the following are brief comments on the nature of the injuries:

(1) *Fractures.* The number of accidents resulting in bone fractures totalled 39. Thirteen of these were fractures of the toes or of bones in the feet.

(2) *Dislocations.* Of the five accidents reported which resulted in dislocation, two involved slipped discs.

(3) *Amputations.* Three accidents resulted in amputation and in all cases the injury was confined to the tips of the fingers.

(4) *Moderate accidents.* Of the 216 accidents classified as moderate, 74 resulted in strains or sprains, 61 in bruises and 58 in lacerations or cuts.

50. It was not possible to compare the accident severity on the survey sites with that on sites operated by the firms in 1965 because comparable sites were not available. However, views expressed by contractors, especially those within the group schemes whose workload and labour strength were relatively constant, were that where they had experienced a rise in their reportable accidents, it was amongst accidents which resulted in moderate rather than in severe injury.

Length of absence from work

51. The survey team were able to obtain information about the length of absence from work which followed the injuries sustained on sites during the period of the survey. The results obtained, which are given in Appendix 15 (excluding the three fatalities) can be summarised as follows:

Under 1 week	1/2 weeks	2/3 weeks	3/4 weeks	4/6 weeks	6/8 weeks	8/13 weeks	Over 13 weeks
36	85	55	25	26	16	17	7

It will be seen that 201 accidents resulted in absences of less than four weeks and these on a basis of length of absence might be termed moderate. By the same formula 69 of the accidents reported would be classed as severe.

52. If the accidents classified as severe and moderate as in para. 48 are sub-divided within the two groupings to show the length of absence, the following results are obtained (see Appendix 16).

	Under 1 week	1/2 weeks	2/3 weeks	3/4 weeks	4/6 weeks	6/8 weeks	8/13 weeks	Over 13 weeks
Severe... ..	—	5	3	6	11	7	14	5
Moderate ...	36	80	52	19	15	9	3	2

The table shows that had accident severity been classified purely by length of absence, 29 accidents classified as moderate by nature of injury but resulting in absences of over four weeks would have been shown as severe and 14 accidents classified as severe by nature of injury would have been

shown as moderate. This would have increased the percentage of severe accidents to 25.5 per cent. It will be noted from Appendix 16 that some amputations, fractures, dislocations and eye injuries classified as severe only gave rise to comparatively short absences.

53. The analysis given in Appendix 19, comparing length of absence from work following injury with the age of the worker, do not suggest any unusual factors which might be attributed to the age of the worker. As might be expected, the 18-30 age group have a slightly higher proportion of the very short absences while the 51-60 have a higher proportion of the long absences. The three fatalities occurred in the older age groups, two workers concerned being between 41 and 50 and one between 51 and 60.

54. The team also considered the view, often put to them during the enquiry, that where formerly the injury would have caused an absence of three days or less the absence is now commonly over three days and the accident therefore reportable. In support of this it is argued that the gradual increase in the rates of state benefits has enabled a worker to stay away from work when incapacitated without suffering undue financial hardship. These benefits were increased substantially in March 1963 and again in January 1965. State benefits are not of course the only source of revenue for an incapacitated man. There may also be some income tax rebate plus the saving a man may make by not having to buy his Insurance stamp. The industry has arrangements under the Working Rule Agreements for sick pay where absences last more than three days. Certain contractors were found to operate independent non-contributory insurance schemes where a percentage of the weekly salary was paid if absence was caused through injury. These schemes varied but were generally based on a qualifying period of service. The trade unions also paid some accident benefit which varied from union to union.

55. Certain of the injured persons confirmed that, although they were financially worse off by staying away from work after an accident, the benefits they now received were such that they were not forced to return to work before they were fully fit, as they might have done a few years ago. Union representatives agreed that improved benefits had created a tendency for people to stay from work with injuries which would formerly not have been reportable, but rightly pointed out that the benefits were intended to help people regain their health at home without suffering undue hardship. On this evidence the survey team's investigations would seem to indicate that the various benefits now available enable employees with injuries to stay away from work without financial hardship until they are fully fit and that this is a contributory factor in the rise in reportable accidents. The importance of this factor is one which, within the confines of this survey, could not be assessed.

Conclusion

56. There is evidence to suggest that workers are now better able financially to withstand necessary periods of absence from work which will ensure full recovery from injury. This could be a factor in the rise in the total number of reportable accidents in recent years.

The Standard of reporting accidents

57. When the results of the 1962 survey (see para. 2) were announced later that year considerable publicity was given to the matter and the Factory Inspectorate took certain measures to make contractors fully aware of their legal responsibilities concerning the reporting of accidents. These measures included:

- (a) instructions to Inspectors to pay special attention to reporting at all routine visits;
- (b) improvements in the layout of the general register F 36 including a prominently displayed summary of the law and a supply of forms F 43B attached to the register; and
- (c) the despatch in April 1964 of an explanatory leaflet Form 2139 to all contractors.

58. The team are of the opinion that the total of 270 reported accidents represents a true picture of the accident position on the survey sites. Because of the frequency of visits paid and the routine checking of site records during these visits, it is extremely doubtful whether any accident which should have been reported did in fact go unreported. During discussions with contractors, however, particularly the smaller firms, it was freely admitted by them that over the past two years accidents had been reported which would not previously have been considered reportable. It had been the tendency amongst these firms to report only those accidents which they considered were of a serious nature, usually the type which resulted in serious bodily injury. The various strains and sprains caused by handling goods or stumbling, even though they were followed by a period of disablement, had been considered to be of such a minor nature that they were not worth reporting.

59. An attempt was made to compare the accidents reported from all sites within the survey during the year 1965 with those received during the first six months of 1966. Because of the changing nature of the sites and the difficulty in obtaining records of numbers employed in 1965, with two exceptions it was not possible to estimate whether or not there had been an improvement or deterioration in the position. A summary of the accidents received from the various sites during 1965 and the first six months of 1966 is as follows:

Code no.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Reported accidents 1965 ...	56	101	3	—	3	—	4	73	8	16	1	2	51	70	21
Reported accidents 1st January to 30th June 1966 ...	73	43	7	—	8	8	15	19	10	16	3	2	28	30	8

60. The exceptions to the statement made in the previous paragraph are the group scheme and the comparable group (code nos. 13 and 14) where the total workload from year to year throughout the firms concerned does not appear to change substantially. It will be seen from the above table

that the position in the comparative group of contractors has shown some improvement whilst the accidents within the group scheme have increased. During the period of the survey, however, records of the firms within the group scheme were examined and three accidents which occurred in 1965 were found which had not been reported. These would bring the effective total of reported accidents for 1965 to 54 and would indicate that the accident rate within the group scheme was relatively constant during 1965 and the first half of 1966.

Conclusion

61. The conclusion reached by the team was that, whereas improvement in the standard of reporting of accidents had a substantial effect on the increase in the number of accidents reported from sites in 1964, its effect decreased in 1965.

PART IV SAFETY ORGANISATION

General

62. In the course of disseminating advice on accident prevention the Ministry has stressed that every firm should formulate and apply a positive safety policy. Since it is vital that the safety effort should have and be seen to have the full backing of top management, it has been advocated that one of the directors or principals of a firm should be given specific personal responsibility for safety matters and that this should apply whether the firm is large or small.

63. The next link in the safety organisation is the appointment of an efficient safety supervisor, a statutory requirement for all firms employing over 20 work-people. It has been envisaged that on the one hand the safety supervisor would have assistants in large firms and on the other that in smaller firms he might be engaged part of his time on safety duties, the essential point being that having regard to all the circumstances he should have the time necessary to carry out his duties. In addition he should have direct access to the director responsible for safety matters and so be able to give advice which, when passed to site level, clearly has the support of top management. The legislative requirements for the appointment of a safety supervisor are set out in regulations 5 and 6 of the Construction (General Provisions) Regulations 1961 and are reproduced in Appendix 21.

64. An efficient safety organisation needs to keep a close watch on the training of supervisors, foremen and operatives (with particular emphasis on new entrants) in safe ways of carrying out the job and to encourage continued worker interest in accident prevention methods by participation in talks and discussions including the formation in appropriate cases of joint safety committees. Over recent years the industry, through active support from the major federations, has arranged short safety training courses (mostly of one or two days duration) for supervisory staff and young persons and in most cases these have taken place at established safety training centres. The Ministry has been able to assist this voluntary effort in certain areas by making available space in Government Training Centres. The Royal Society

for the Prevention of Accidents also periodically organises construction safety training courses of five days duration. There have also been some courses at technical colleges. A new development in the training field has been the establishment by the Construction Industry Training Board of a training centre at Bircham Newton, Norfolk. The first courses each of a fortnight's duration and designed for plant operatives, commenced in September 1966.

65. A number of firms, particularly the larger ones, are known to have established effective safety organisations and in this respect some have followed guidance given in a booklet issued by the National Federation of Building Trades Employers entitled "Organise for Safety". The remainder of this chapter contains an appraisal of the safety organisations, or lack of same, which the Inspectors found during their enquiries. In addition to initial comments on appointed safety supervisors and supervision at site level, there are sections covering the use of technical staff in dealing with the more complex safety measures, safety committees and safety training and propaganda, followed by a general summary of the position as found by the survey team.

Safety supervision on the large sites

General

66. The survey team in addition to visits to the large sites also visited the headquarters of the main contractors and some of the larger sub-contractors to explain the objects and methods to be employed on the survey. As a result they were able to assess management interest and participation in safety matters and obtain background information about appointed safety supervisors. This could not, however, be extended to all sub-contractors and assessment of safety organisation in these cases had to be based on the standard found on the sites. In the case of safety supervisors the team took as their norm a supervisor who had a working knowledge of safety legislation and of safe working methods and the ability to organise accident prevention generally. This was related to the site on which they were required to advise e.g. an average safety supervisor on a housing site might not be equipped to supervise a civil engineering site. Training was only considered where the appointment had been comparatively recent.

Site no. 1

67. This was a power station site covered by a joint site safety supervisor appointed by the majority of the contractors working at the station. To ease administrative difficulties the safety supervisor was taken on the strength of the main civil engineering contractor and paid by that firm but his nominal employer had a satisfactory arrangement for collecting contributions from the other contractors concerned. The safety supervisor who had been appointed had carried out similar duties on other power stations. He had the necessary knowledge and experience to carry out his duties properly and undertook regular inspections of all parts of the contract reporting defects where necessary to the contractors responsible. He investigated only the more serious type of accident. In addition to his safety supervisory duties the joint site safety supervisor organised the training of personnel in first aid, a scheme which was extremely satisfactory.

68. In addition to the joint safety supervisor two contractors had full-time site safety supervisors and three others had employees on site part of whose duties comprised safety inspection. The standards of the two full-time safety supervisors differed. While both had had only limited training in safety matters (one had attended a two-day course and the other was awaiting a RoSPA course) one succeeded in making an impact on working conditions within his own firm. This could not be said of the other who also lacked sufficient practical site experience. The three part-time safety supervisors were of foreman status. They were all of a reasonably good standard and, with one exception seemed to have sufficient time to give adequate attention to accident prevention. Two had attended two-day courses and one was awaiting a course. It is interesting to note that the safety performance of two of the firms employing part-time safety supervisors were superior to that of one of the contractors served by a full-time supervisor. The two agents in charge of the site were conscientious and knowledgeable in accident prevention methods and were an important influence in maintaining site safety. They too had attended two-day safety training courses. Three smaller contractors were visited regularly by their appointed safety supervisors.

69. Safety matters were discussed at monthly meetings of the safety supervisors, chaired by the joint site safety supervisors. The latter reported to the agents' monthly meeting which the resident engineer of the CEGB attended. This aspect of the safety organisation is discussed in greater detail in paras. 129-139. In fact the system as practised at this station was one of individual contractor effort under the co-ordination and supervision of the joint safety supervisor. The accident statistics for the station during the period of the survey were higher than those for the second power station but it cannot be concluded that the system was unreasonable. It is believed that conditions on the station would have been better if there had been earlier co-operation between the various bodies concerned, coupled with firm leadership and better communications to ensure that decisions were effectively carried out.

Site no. 2

70. This was also a power station site with a joint safety supervisor directly responsible to a site safety committee who at the outset was paid by the main civil engineering contractor but later by the main building contractor, with other contractors contributing according to the number of employees at risk. The safety supervisor was most knowledgeable in safety matters, first aid and fire prevention and rescue work. As well as doing the work of the joint safety supervisor, he was chief officer of the power station fire prevention team which was well equipped and the gear included a fire tender. He had previously carried out similar safety duties on a power station site and had been fortunate in working with the same resident engineer and the same chairman of the site safety committee. The safety supervisor was persistent yet tactful and could be very firm when necessary. There is however, no doubt that his effort was assisted by the personal interest and backing of the resident engineer and the area of responsibility system devised by the site safety committee (see paras. 134-138).

71. There were two other full-time safety supervisors on the site employed by main contractors and all the other contractors employing over 20 employees on the site were required by the Safety Committee to appoint a site employee to be responsible for safety and to be a member of the Committee. The latter were either deputy agents or other senior persons and regularly visited work in progress quite apart from any periodical visits which might be made by appointed safety supervisors from the firms' HQs. The two full-time safety supervisors were intelligent and dedicated men who had been a long time on safety work. The team was generally impressed with the supervisors at this station but realised that they were only able to operate as effectively as they did by reason of the positive lead given by the site Safety Committee.

Site no. 3

72. The site, a local authority housing site, was understood to be behind schedule due to the weather in the early months of the year and persons in authority on site seemed to be under stress to try to make up the lost time. Perhaps a measure of this stress is reflected in the fact that there were accidents to four persons in authority as against three to operatives. The appointed safety supervisor on the site was the agent who had attended a two-day course at a recognised training centre but had in addition considerable experience of safety matters. Breaches of the regulations could be found and the team formed the opinion that the agent had too much to do so that he was unable to give the necessary time to safety supervision.

Site no. 4

73. This site was subject to the periodical visits of a fully experienced safety supervisor from the firm's head office who was full-time but with many sites to cover, his attendance was not frequent. However, a director with a good knowledge of safety requirements visited weekly. This was a speculative housing site where the tempo of work was not high. There was satisfactory compliance with statutory requirements and there were no reportable accidents during the period of the survey.

Site no. 5

74. The nominated safety supervisor for this site where an office block was being erected devoted more than half of his time to safety matters and the remainder to personnel work. He was fully experienced on the safety side. He considered his personnel duties to be beneficial to safety in that he was able to choose suitable labour initially and to redirect workers who did not fit into particular sites because of personality or experience e.g. he was able to transfer a diabetic to a job where he was exposed to little risk of injury. He was well backed by an enthusiastic management but suffered from poor standards by certain sub-contractors and had no hesitation in turning to the team for help in dealing with them. The failures of the sub-contractors accounted for the poor accident incidence rate on this site.

Site no. 6

75. The safety supervisor was an experienced site agent who had received a two-day safety training course at a recognised centre and the general foreman had also received similar training. Both were knowledgeable on

safety matters. The main sub-contractor employed two full-time experienced safety supervisors, one of whom regularly visited the site, sometimes three times a week. The work comprised the erection of local authority flats using precast concrete sections. The accidents, eight in number, including several strains and sprains caused by handling awkward shaped loads, represented double the incidence rate for site no. 3.

Site no. 7

76. The site concerned the construction of four-storey blocks of flats for a local authority and was visited at least once a week by a fully experienced full-time safety supervisor operating from the firm's regional office. No one on site, however, had been given the specific duties of site safety supervisor. Even though all the site supervisory staff expressed interest in safety generally, and possibly attempted to improve standards within their own particular section, it was felt that some co-ordinating factor was lacking. It was noted that it was the small things that went wrong on this site and led to a high accident incidence rate. They were the types of hazard that could have been avoided by a daily rather than a weekly inspection. Indeed with a site of this size (an average labour force of 250) someone on site was needed to carry out the duties of site safety supervisor if only on a part-time basis.

Site no. 8

77. Frequent visits were made by the firm's full-time safety supervisor who had a good understanding of statutory requirements and accident prevention methods. This site presented him with a difficult task because of the large number of sub-contractors engaged in a wide range of work with several trades working at the same time in restricted areas and at different levels. He had also to advise on construction work being carried out in demolition areas. It had been recognised before the survey commenced that the safety supervisor had too much to do and the firm were at that time recruiting an additional supervisor who was appointed towards the end of the survey period. Conditions on the site would have been much worse if the agents on site had not been safety minded. The safety supervisors of other firms called occasionally at the site but no real assessment of the value of these calls could be made. There were 19 reportable accidents and the team formed the opinion that the higher than average accident incidence rate was due in the main to lack of attention to safety matters by sub-contractors.

Site no. 9

78. This was a road project, though with a smaller average labour force than site no. 10. During the first half of the period under survey the duties of safety supervisor were undertaken by a sub-agent. It was obvious that this employee had other pressing duties to perform, with the result that he had little time to devote to safety matters. The firm had a fully-experienced head-office-based safety supervisor who was unable to make frequent visits to the site because of other commitments; he was virtually a one-man safety organisation. He had previously been employed on the technical side of the firm and had attended a RoSPA course. As a result for the first half of the survey period there was no organised programme of safety inspection on site. Fortunately, for the first two months of the year

little work was possible because of adverse weather conditions. The contractors eventually appointed a full-time safety supervisor for the site. He was new into the industry, but fortunately had been a safety supervisor for a number of years in another industry and was thus equipped with a knowledge of basic accident prevention methods. Conditions on site improved during the second half of the survey and there was evidence to show that the safety supervisor's visit and follow-up procedure was paying dividends.

Site no. 10

79. This was a road contract for which a full-time site safety supervisor had been appointed. He had worked as a safety supervisor for about five years and had had previous road contract experience. He carried out regular site inspections, often accompanied by the works superintendent and investigated all accidents reporting on the circumstances. He appeared to have direct access to the contract manager and his advice was always given due consideration. He was an enthusiast and his enthusiasm was reflected in conditions on site which were above average. The site accident record was good in view of the large labour turnover which took place.

Site no. 11

80. This was a new comprehensive main drainage system for a medium sized town, involving both tunnelling and open cut-work. The contractors had a head office based safety supervisor who visited the site about twice a month. The site engineer had been appointed as the site safety supervisor. It is doubtful whether he had sufficient time to contribute much to site safety. Whilst no fault could be found with the tunnelling section of the contract, especially those sections involving the use of compressed air, timbering in the open cut-work could have been improved. This situation would have been improved by the presence of an effective site safety supervisor.

Site no. 12

81. This was a large modernisation programme of an existing factory carried out by a firm of contractors with a positive outlook on safety. The site was visited regularly by a full-time safety supervisor. The general foreman had also been given the duties of site safety supervisor. He had attended a two-day safety training course and his knowledge of the requirements of the regulations was above average. Site conditions were good and it appeared that the foreman had sufficient time to carry out his duties in a conscientious manner.

Conclusions

82. On those larger sites where the accident incidence rate was above average, it was usually possible to point to the safety supervisor having insufficient time to carry out his duties effectively. There were cases where safety supervisors lacked detailed knowledge of safety legislation and also cases where they had insufficient background knowledge of the industry.

83. Where there is a large labour force on the site, consideration should be given to the appointment of a site safety supervisor in addition to the appointed safety supervisors of the individual firms who may only visit the site periodically.

The Group Safety Supervisor Scheme
(Code No. 13)

General

84. The group scheme is operated through a company formed in 1963 limited by guarantee. The safety supervisor is employed by the company and not by any of the 20 contractors subscribing to the scheme. Although action to initiate the scheme was commenced through the local organisation of the National Federation of Building Trades Employers, it was eventually set up independently of the Federation. Membership is, however, restricted to paid up members of the Federation or affiliated bodies. There is an executive committee comprising a Chairman and two other members, which meets when necessary. Each member sits for a maximum period of three years. The Articles of Association require a general meeting of all members at least once a year.

85. The objects of the Group are as follows:

- (1) To engage the services of one or more duly qualified safety supervisors.
- (2) To collate and disseminate information on all matters relating to industrial safety precautions and regulations.
- (3) To give advice on matters affecting safety.
- (4) To provide a service commensurate with compliance with regulations 5 and 6 of the Construction (General Provisions) Regulations.

86. Subscription is calculated on a fixed rate per £1,000 of wages paid but is subject to a maximum and minimum figure. Eight of the members employed 20 or less employees and did not therefore have an obligation to appoint a safety supervisor. They willingly paid the minimum subscription, however, in order to participate in the benefits of the scheme. They found great satisfaction in knowing that if problems arose they could contact the safety supervisor to obtain advice. Additionally they were kept informed of new legal requirements without having to keep a constant eye on trade journals and other publications. The remaining twelve contractors were required by law to appoint a safety supervisor. Eight employed under 100 workers and one employed over 300. Certain of the larger contractors were paying the maximum subscription but without exception no matter what the level of subscription, the feeling was that they would be unable to provide for themselves at a similar cost the type of service they were obtaining from the Group. One of the larger contractors had, before the formation of the Group appointed one of his own staff as a part-time safety supervisor. He realised that this method was not securing the desired effect and was quite prepared to pay the maximum subscription to ensure a better service.

87. A safety supervisor was appointed by the Group at its inception. He was still in post during the time of the survey. He is an experienced man having held positions as safety supervisor in a large industrial organisation and also on a power station site. He has an excellent knowledge and understanding of the statutory requirements and of practical accident pre-

vention methods and his opinion and advice were generally accepted. The Group had acquired a good local reputation and there is apparently a waiting list for membership.

Work method

88. The safety supervisor's instructions were to visit all sites of group members which had been registered with him. In practice members forwarded to him copies of all forms F 10—notice of commencement of construction operations—sent to HM District Inspector of Factories. He normally operated within an area of 50 miles radius of the company's registered office. On the occasions when the larger firms developed sites outside this area he was allowed to visit provided the contractor involved paid for the extra mileage. It appeared that when these occasions arose the firms were always willing to pay the extra cost. During the period of the survey the safety supervisor had an average of 50 to 60 sites to inspect. The sites were never left for more than a fortnight without inspection while some of the larger and more important sites were visited weekly and sometimes bi-weekly. A notice of all defects found was left with the site foreman and if these defects were of a serious nature a copy was sent to the firm's head office. If a matter requiring immediate attention was noted a personal approach was made at director level. If subsequent visits revealed that no progress had been made and that there was little or no response from the contractor's senior management, the circumstances were reported to the Group's executive committee who had power to demand from the offending contractor the reasons for his non-compliance with the safety supervisor's requests. Continued non-compliance could then lead to expulsion from the Group.

89. Copies of all accident report forms (F43B) sent to HM District Inspector of Factories were also forwarded to the safety supervisor. He did not investigate all these accidents but was able to select for investigation those where he felt some action was needed. The safety supervisor was responsible for ensuring that all the requisite forms and registers were kept on each site. He had also to advise the contractors on any new legislation and to see that sufficient copies of the new legislation were available for all firms. He worked from an office at his home and all contractors knew that they could contact him at this office during a specific hour each day. In this way they were able to notify him of problems that had arisen or were able to request visits to specific sites.

The Group record during the period of the survey

90. During the period of the survey the Group reported 28 accidents, five caused injuries classified as severe and it was estimated that seven of the accidents might have been avoided had there been full compliance with the statutory requirements. Of the seven breaches, three involved stepping on timber with projecting nails, two unsafe access at ground level, one lifting heavy weights and one maintenance of transport.

91. Observations on all sites within the Group during the period of the survey showed that site conditions and compliance with statutory requirements were generally average or above average. Due to poor site supervision there were exceptions and three contractors were, or were about

to be, the subject of Group discipline. When the Group safety supervisor found it necessary to report defects to a firm's head office in person, his comments were normally accepted without question and immediate steps taken to remedy the defects. Action was generally taken by means of written or spoken instruction but the instruction was quite often followed by a personal visit from the Director or other member of the senior management of the firm concerned to ensure that it had been carried out. The senior management had a knowledge of the more basic requirements of the regulations but it was generally found that they depended on the advice of the safety supervisor.

92. It was interesting to note that contractors within the Group attempted to exercise influence on the methods of working of non-Group member sub-contractors employed on their sites. The safety supervisor kept a close watch on the activities of sub-contractors and after advising the sub-contractor on site, reported defects to the main contractor. On a number of occasions this resulted in the withdrawal from site of unsatisfactory hired plant. This active interest in the working methods of sub-contractors can only lead to safer site conditions and it is a feature of the Group which deserves special mention.

93. With a good example from top management it was only to be expected that generally site agents and foremen had a more than average interest in safety precautions on their individual sites. With a few exceptions they were keen and co-operative. The exceptions, however, demonstrated quite effectively that all the efforts of senior management can be nullified if the immediate site supervision is unco-operative and untrained. It was the custom of the safety supervisor, in wet weather, to visit site offices purely to discuss certain aspects of the regulations and to advise generally on the completion of site records. Site supervisors had each been given copies of the respective regulations and also a guide to the regulations published jointly by the Federations. Discussions with agents and foremen showed that they had read these documents and were prepared to discuss the difficulties they had encountered.

Conclusions

94. It is considered that the Group as constituted during the period of the survey provided sufficient employment for one safety supervisor. It can be commended for the following reasons:

- (1) It provides a satisfactory method for small and medium sized firms of complying with regulations 5 and 6 of the Construction (General Provisions) Regulations.
- (2) It provides an economic method of attaining site safety supervision through a safety supervisor employed by a limited company who owes no special allegiance to any one particular member.
- (3) It promotes an inter-change of ideas on accident prevention methods between member firms.
- (4) There is internal discipline to ensure that each member does all in his power to uphold the aims of the Group.

(5) The company can afford to pay a salary which will attract the right calibre of safety supervisors.

95. The success of any such group depends on the individual contribution of each member, on the calibre of the safety supervisor, and on the calibre and interest of each member's site supervision.

The comparable group (Code No. 14)

General

96. The contractors in the comparable group can be divided into five sections as far as safety supervision is concerned as follows:

Section	Type of safety supervision	Number of contractors concerned
1	Own full-time safety supervisor	3
2	Safety consultant	5
3	Group safety supervisor employed by an employers' federation	3
4	Part-time safety supervisor including in some cases members of management	6
5	No statutory requirement to employ safety supervisor ...	2

Management interest and safety supervision varied considerably and details of the position within each of the five sections are briefly given below.

Section 1

97. One contractor employed a safety supervisor who was an ex-site agent, keen on his job and producing results. There was noticeable management participation and there were no reportable accidents. Another contractor employed a man who was a retired works' manager, knowledgeable and keen, who was supported by senior management. This firm reported two accidents.

98. The third contractor employed an ex-site agent who was keen and had a reasonable knowledge of the regulations. There were three reportable accidents on the firm's sites, only one of which in the opinion of the team could have been prevented by foresight on the part of the supervisor. He had reasonably good management support.

Section 2

99. Four firms employed the same safety consultant who visited the sites on a rota approximately once every ten days. He left instructions as to what was required to be done and usually also reported to the firms' HQs. Generally he was not called in specifically to investigate accidents. There was little management participation so that the sites were found to be dependent on the attitude of the foremen. There were 17 reportable accidents on these sites, the majority of which could have been prevented by better training of workers, particularly as regards lifting techniques and more generally in taking care of their own safety.

100. The fifth firm in the section also employed a safety consultant who had previous experience in industrial safety. The two housing sites concerned were under the control of a knowledgeable site agent and building progress on one of the sites was at a slow rate. There were no reportable accidents.

Section 3

101. The three contractors were served by two experienced group safety supervisors employed by an employers' federation. Two contractors were in the same group and had three reportable accidents. The third contractor had one reportable accident (over which he had no control) when a worker was struck by a corrugated iron sheet blown from another site in a high wind. It was noted that the sites served by the Group Safety Supervisors seemed, on the whole, better than those served by safety consultants and it is thought that this may have been because site supervisors considered that the Federation link provided some basic form of authority. On the other hand whilst in two firms there was active management interest the position on a few of their sites was dependent on the attitude of the foremen and site conditions suggested that even though the safety supervisor was carrying out his duties competently his advice was not, in fact, being followed. This emphasizes the importance of active management control.

Section 4

102. All six firms in this section had safety supervisors with other duties and one of the firms was one of the largest in the survey. This latter firm employed an experienced senior safety supervisor who visited all sites from time to time but the firm relied mainly for safety supervision on part-time safety supervisors who were agents or general foremen, all of whom had been on a two-day course at one of the recognised training centres. Management participation was considered to be active and the firm had only one doubtfully reportable accident during the survey period. This was particularly interesting because labour turnover was high and a wide variety of projects was being undertaken.

103. The safety supervisor for one firm was the managing director who had attended a two-day safety course at a recognised centre. He visited his sites at least weekly and on the site subject to the survey employed a young safety-conscious foreman. There were no reportable accidents.

104. In another firm one of the partners who was always on site was appointed as safety supervisor. The standards on the site were average with two reportable accidents, both to the employees of a sub-contractor.

105. In the fourth firm in the section, a large one specialising in schools and housing, the safety supervisor was a director of the company. Three of the firm's sites were covered by the survey and the standard on each was good, the safety supervisor visiting frequently and regularly. The sites were reasonably clean despite the bad weather and had good access roads. Two of these were school sites which were also in the middle and later stages when the influence of the weather on the site is not so marked. There were no

reportable accidents and only 23 minor accidents mostly cuts and grazes. Because of the size of the firm the team felt that this type of safety organisation could not be expected to succeed without other trained persons on the sites. It appeared to have done so, however, but it must be emphasized that the men on the site concerned had been together on system building of schools for some years with few changes in the gangs. The foremen concerned were found to be generally aware of the main regulations with which they were mostly concerned and this too, led to a safe system of work.

106. The fifth contractor's site, a speculative housing development, was of considerable interest in that there were only two employed persons on the site, namely an agent (who was appointed as safety supervisor) and a storeman. The remaining workers were labour-only sub-contractors. The safety supervisor had received a short course of training at a recognised centre and was very co-operative. There was active management participation by the firm in charge of the project. The standard of compliance with the regulations was above average and the site was kept extraordinarily tidy. There were no reportable accidents and only one minor non-reportable accident requiring hospital treatment. There were undoubtedly a few dressings for cuts during the period but these were not recorded by the self-employed persons. The labour-only sub-contractors comprised three bricklayers, two joiners, three plumbers, one painter and two labourers. Two sub-contract labour-only self-employed tilers came to the site as required, as did one electrician. All persons seen on the site wore stout shoes or safety boots and possessed good outerwear i.e. donkey jackets and good overalls. The joiners all wore safety boots and it was explained to the team that falling timber and protruding nails were special hazards for joiners.

107. The last of the six sites in this section was a large speculative housing site subject to the safety supervision of a knowledgeable site agent and it produced one doubtfully reportable accident—a strained back not reported at the time. This was a site a long distance from the firm's head office where the site agent had to rely on local labour.

Section 5

108. Neither of the two firms concerned had an appointed safety supervisor. One firm never employed 20 persons and the other only occasionally reached that figure. The first firm employed a high proportion of craftsmen with long experience who had developed a "built-in" safety sense. The other firm was engaged in building bungalows for private sale. Neither firm had any reportable accidents during the survey period.

Conclusion

109. Investigation shows that whatever the form of safety supervision it can only be effective if it is supported by management control to ensure that there is action at site level to implement safe working methods. There is firm evidence that failure on the part of management to take a serious interest in safety matters results in reportable accidents on types of site where other firms can have clear or almost clear records. The safety training of site supervisors is again shown to be vital.

Local authority sites and methods

110. The local authority included in the survey employed a general safety supervisor with both workshop (engineering) and construction (large national contractor and power station) background. He was responsible directly to the establishment officer and to the heads of the various departments. He was expected to effect compliance with the Factories Act and Regulations on all sites and in all workshops subject to them. This required him to supervise the safety of some 600 industrial workers quite apart from any duties he may have had under the Offices, Shops and Railway Premises Act. His work varied from the oversight of timbering of sewage excavations, to advising on direct labour construction work and concerned him with roadsign placing for safety during highway construction and repair. Until five years ago the Corporation's various departments were each responsible for safety measures in their own yards and on their own sites and to a certain extent they still have such a duty but with the assistance of the safety supervisor.

111. The following departments were mainly concerned with construction work:

- (i) The City Engineers Department (includes road, sewage works and estates maintenance);
- (ii) The Education Department (school and college painting);
- (iii) The Housing Department (housing maintenance);
- (iv) The Water Department (mainlaying).

112. Labour turnover was fortunately negligible which, in effect, meant that the majority of workers were well instructed in their jobs and in consequence less likely to produce the accident associated with lack of experience. Nevertheless the local authority had eight reportable accidents during the period of the survey and most of these could have been prevented if the workers had had sufficient training in safe working methods. Six of these were concerned with work carried out in the housing maintenance department which employed most of the construction workers. These men used ladders, including roof ladders, extensively and undertook heavy lifting of such items as concrete fence posts, fireplaces and chimney pieces. The local authority are considering setting up a training school and making the facilities available to neighbouring smaller authorities.

Conclusion

113. The team felt that this local authority had done much in the safety field.

Duties of competent persons

General

114. None of the accidents investigated by the team was caused directly by the failure of a competent person to carry out his assigned duties. The remarks which follow, therefore, are based solely on the observations of the team during normal site inspection.

115. On all sites it was found that the standard of record keeping was above average. This may well have been due to the survey itself since the contractors realised that their registers would be subject to close scrutiny during the period of the survey.

Inspection of scaffolds—regulation 22 of the Construction (Working Places) Regulations 1966

116. The weekly inspections of scaffolds in use appeared to be carried out quite regularly. On smaller sites these were done by the foreman or scaffolder who had erected the scaffold, and on the larger sites by the scaffolding foreman. Occasionally remarks such as "toe-board missing" or "ladder to be tied" were noted in form F 91, Part I, but it was generally found that the normal entry was "In good order". Although on certain sites subsequent inspection by the team showed the last remark to be well merited, on others this entry in the register was more a pious hope than a correct description of the state of affairs. This situation, of course, casts doubt on the competency of the persons carrying out the statutory inspections, although it may be in some cases that, either through lack of time or lack of inclination, a competent man has neglected to carry out his duties properly. On the majority of sites operating under the Group Scheme (no. 13) scaffold inspections were being carried out by foremen or agents, who had a fair knowledge of the requirements of the regulations and adequate practical experience of the type of scaffold in use. It must be said at this point, however, that the scaffold being used was generally of a simple type. On a few sites under the Group Scheme and on a number of sites in the Comparative Group (no. 14), the persons inspecting the scaffolds, even those of the simple type, gave the impression that they did not really understand the purpose of their inspection which is to ensure that the strength or stability of the scaffold has not been affected since the last inspection and that the statutory requirements are fully complied with. Their knowledge did not go much beyond the provision of guard-rails and toe-boards. It is significant to note that some of these "competent persons" were the scaffolders who had erected the scaffold. They were, in fact, being asked to inspect their own work. It is a desirable principle that men should not carry out a statutory inspection of their own work. The fact that a man may be competent to erect and inspect his own work should be weighed against the numerous cases where faults have been built into the scaffold because of the scaffolder's lack of knowledge of his craft and have not been brought to light at subsequent inspections because of this same ignorance.

117. On the larger sites where a greater variety of scaffolds was used, the weekly inspection was normally carried out by the foreman scaffolder. From their observations, the team did not find any obvious cases of incompetence.

Lifting machines and associated gear—regulations 10, 28 and 46 of the Construction (Lifting Operations) Regulations 1961

118. Without exception the six and fourteen monthly examinations of lifting appliances in use on the sites under survey were being carried out by engineering surveyors employed by insurance companies. There was nothing

to suggest that these examinations were inadequate, though there was sometimes some difference of opinion between the contractor and competent person as to the time allowed for certain repairs to be completed.

119. The weekly inspections of lifting appliances were normally carried out by the contractor's own staff and again there was a wide variation in the standard of competency. The inspections of cranes and excavators were carried out by the drivers, although in certain cases there was the tendency to confuse the weekly inspection required by the Regulations with the regular maintenance required by the firm. In the latter case it was not unusual for the register to be kept in the foreman's office and for the driver not to have signed it. Nevertheless, it was felt that even in these cases the contractors were complying, however inadvertently, with the spirit if not with the letter of the regulation and that in their routine weekly maintenance, the drivers were carrying out checks on the safe working of their machines. The general impression gained was that the regular crane drivers were competent to carry out the weekly inspections but that it was the organisation of the inspections on the part of the contractor that was at fault. There were exceptions to this lack of organisation for example one contractor, who also specialised in plant hire, had issued a register to each driver and the latter's weekly entries were checked by the safety supervisor. Attached to the register were copies of the test certificates and report of the latest fourteen monthly thorough examination, so that all documents relating to the crane were immediately available for inspection.

120. Weekly inspections of lifting appliances which did not have a regular driver were carried out less thoroughly than in those cases where a regular driver was employed. Certain of the smaller sites used platform hoists, small jib cranes attached to the scaffold and an assortment of gin wheels and pulley blocks. It was the exception rather than the rule for a qualified fitter to be sent to the site from the firm's head office to carry out weekly inspections of these items of gear. The inspections were normally carried out by the site foreman who was competent enough to ensure that the hoist enclosure was fitted with gates and to check on the condition of the hoist rope but often not competent to check on the arrester gear. The larger sites normally carried maintenance fitters on their staff and they were responsible for the weekly inspections of this smaller gear.

Excavations (regulation 9 of the Construction (General Provisions) Regulations 1961)

121. There was comparatively little work done on the sites under survey which required precautions to be taken against the collapse of excavations. One contractor was carrying out a comprehensive sewerage system which involved a substantial amount of excavation. The inspection was carried out by the site engineer who had had a great deal of experience of this type of work and while no fault was found with the tunnelling section of the contract, timbering in the open-cut work was not of such a high standard. Another contractor forming part of the Group Scheme (No. 13) was also undertaking the construction of a new sewer. Some of this work was being done in ground where the maximum precautions were necessary and were in fact taken. Frequent inspections were carried out by the site agent, again a man of long experience, whose competency could not be doubted.

Conclusion

122. On the larger sites the duties of competent persons undertaking inspections under the Regulations were carried out to a reasonable standard. On the smaller sites the standard varied considerably and examples were found of employees whose competency left much to be desired, carrying out statutory inspections. It is a desirable principle that men should not undertake a statutory inspection of their own work.

The use of technical staff in dealing with the more complex safety measures

123. The team received assurances from management that every measure was taken to use the experience and technical knowledge available in the firm when planning operations. Where the work concerned was on power stations, blocks of flats and public buildings, methods of shoring and timbering and erecting scaffolding were discussed at site progress meetings.

124. After careful consideration of discussions with management the team formed the view that increased competition in the construction industry had required more firms to plan more carefully on all aspects of the work and that safety methods had gained from this increase in forward thinking. Nevertheless from their general experience the team are aware that planning is often nullified by action on site where alterations decided on the spot, failure to follow instructions or poor supervision in general allow unsafe conditions to arise, e.g. planning required full timbering of a section of a trench but in the event it was only half timbered ; planning stipulated a certain type of scaffold to be used but this was badly or wrongly erected on the site ; at planning stage "hard hats" were stipulated as a site condition but in fact the wearing of them, after provision, was not enforced by the supervisor responsible.

Conclusion

125. There was some evidence to support the view that top technical staff were used in planning for safety but the safety aspects of this planning may be nullified by subsequent action on site.

Consultation with safety supervisors at the planning stage

126. A number of safety supervisors were asked whether they participated in the early planning of a project but the resulting picture was not clear enough to indicate that full use is made of their knowledge. It would be fair to say that, while some supervisors are consulted, the majority are not asked for any opinion until the work has started and the Regulations apply.

127. There was consultation among the various safety supervisors of the main contractors on the power stations but in the course of conversation with some supervisors on the other large sites it became clear that although they were consulted, consultation was often too little and too late. In the Group Scheme consultation often took place in the early planning stage and it was encouraged by the Group as a whole. Three such consultations noted during

the period of the survey included visits by the safety supervisor to proposed sites where diversion of overhead power lines had to be considered and two visits, on separate occasions, to advise on the hazards of demolition of old mill buildings. In the comparable group one safety supervisor was also always called in on early planning of civil engineering projects and two supervisors were consulted on building projects. No actual evidence was available of the safety consultants or other group safety supervisors being concerned with early planning but it was understood from management that this did in fact occur.

Conclusion

128. Some potentially dangerous situations could be avoided and accident prevention problems eased if greater use were made of the experience of safety supervisors at the planning stage of a project.

Safety committees

129. The survey team found safety committees operative only on the two power station sites and these are commented on in the following paragraphs of this section. On some of the other large sites, it was known to be usual for matters raised by the safety supervisor to be discussed at site progress meetings. The team did not, however, attend site progress meetings and could not, therefore, comment whether safety problems received adequate consideration.

Power station coded as Site no. 2

130. The Site Safety Committee elected its own chairman and membership comprised the agents of all the main contractors and the larger sub-contractors, a number of Central Electricity Generating Board personnel including the resident engineer and station-warden, the joint site safety supervisor and contractors' full-time safety supervisors. Although the trade union representatives on the site did not sit on this Committee at the beginning of the survey period, they were subsequently invited to send two representatives.

131. The Committee met fortnightly on a Tuesday and received a report from the joint site safety supervisor prepared as a result of day to day contact with the safety supervisors or nominated supervisors of the other contractors and sub-contractors. The report was part of a planned agenda which included consideration of reports of accidents and of potentially dangerous incidents or "near misses" for the period under review which were investigated by a special sub-committee as soon as the facts were known. The Site Safety Committee took a keen interest in first aid and rescue work and organised a safety week each year. Copies of the minutes of meetings were supplied to all members of the Committee and it was arranged that smaller sub-contractors who were not represented should receive information from the contractor to whom they were responsible.

132. The safety organisation on this site was centred around the Safety Committee and it was in the opinion of the survey team the best organisation encountered during the survey or experienced by the team as individuals.

Of particular interest were the following points:

(a) The Committee was well informed and most members attended regularly.

(b) The resident engineer took a close interest in safety matters and contractors were left in no doubt that failure to comply with the Committee's recommendations would result in quick reference of the matter to a higher level than the senior site representative. The resident engineer was always helpful and readily accessible to anyone on the site which made for good relations and contributed to the helpful and neighbourly atmosphere on the site. As a result most contractors made a great effort in the safety field and the majority of failures could be attributed to the multiplicity of contractors in the same building with the inevitable hampering of each other in such ways as altering or dismantling scaffolds, littering access ways and using each others' gear. This happened despite a system of inspection by "areas of responsibility" whereby particular contractors were made responsible for safety and site tidiness in clearly defined areas. Initially this was the responsibility of the contractor employing the largest number of workers in a particular area but as work progressed the Site Safety Committee reviewed the areas taking into account the decline or rise in the level of a particular contractor's activity. Marginal problems were discussed between neighbouring area supervisors and the joint site safety supervisor or, if necessary, the resident engineer adjudicated on points in dispute.

(c) A good stock of safety boots, hard hats, gloves, donkey jackets, overalls and other protective clothing was provided and the store was opened at regular convenient times with the goods displayed to good effect. Although much of the work connected with the store fell to the joint site safety supervisor (to the knowledge of the team he had sold over 4,000 pairs of safety boots on the site) he at least had the satisfaction of knowing that only one foot accident that could have been prevented had been reported in the last two years.

(d) The system of immediate examination of the facts of "near misses" with subsequent reports to the Site Safety Committee usually led to immediate remedial action.

(e) The Committee's efforts in connection with the annual safety week included the obtaining and presentation of good safety films, inducing contractors to make vigorous efforts to obtain 100 per cent site attendance and the promotion of a competition which attracted entries from over two-thirds of the site personnel. It should be added that the lead to make the week a success was given by the attendance of all senior site staff from the resident engineer downwards.

133. The one criticism of the Safety Committee's organisation was a weakness in the communication of the Committee's recommendations and criticisms to those who were not directly represented at the meetings. This raises the question as to how this can best be overcome when there are a large number of small sub-contractors contracting in some cases to sub-contractors of larger size. One contractor circulated the minutes of the meeting with a signature slip and another posted the minutes where sub-contractors, foremen

and chargehands could see them. While both these methods were better than no action at all it is felt that only by individual contractors personally meeting the responsible representatives of their sub-contractors can the information be carried down effectively to the lowest level of authority. Such a meeting would clearly need to take place as soon after the Site Safety Committee meeting as practicable.

Power station coded as Site no. 1

134. As on site no. 2 safety matters were organised through a safety committee but there were differences in structure and methods. The resident engineer was chairman of the Committee which comprised mainly the site agents of the main contractors together with the joint site safety supervisor. The latter reported on the deliberations of a Safety Supervisors Committee which was in effect a sub-committee of the Site Safety Committee. Both the main and sub-committees met monthly. There were no workers' representatives included in the membership.

135. The accident incidence rate for this site was 44.2 reportable accidents per 1,000 employees compared with 20.8 for site no. 2 and the team sought possible reasons for this difference. First the site was in its early stages and if the conclusions reached in para. 40 are valid, a higher accident rate would be expected during the period when most of the work comprised construction of the shells of buildings compared with the later stages of installing plant and equipment which had been reached on site no. 2. Quite apart from the longer period the Safety Committee on site no. 2 had been in operation so enabling it to gain experience in dealing with safety problems, the chairman, resident engineer and site safety supervisor had worked together as a team on a previous site. Other possible reasons for the lower accident rate on site no. 2 could have been the decision to allocate to contractors "areas of responsibility" for safety matters and site tidiness, the shorter periods between meetings of the Site Safety Committee and the system of on the spot investigation of "near misses" by a sub-committee. On site no. 1 copies of the minutes of the meetings were sent to the main contractors' agents only and it is doubtful whether the views and recommendations of the Safety Committee were passed down the line of authority to sub-contractors. It will be noted, however, that this question of communication was not considered to be fully solved on site no. 2 (see para. 133).

136. The Safety Committee on site no. 1 organised a safety week during the survey but here again compared with a similar week on site no. 2, there were fewer films available and, although some posters were displayed, there was no exhibition tent and efforts to get 100 per cent interest and attendance were not fully successful. Likewise while the sale of safety boots and protective clothing was promoted by the Committee on site no. 1 and placed in the charge of the joint site safety supervisor he was not given shop window type facilities; encouragement to buy protective clothing was confined to illustrated notices at the site safety hut.

137. While in comparison with the results of site no. 2 the organisation of safety matters on this site appeared to be less effective, the team point out that they themselves are aware of other power stations under construction

with less efficient systems and worse accident figures. It has to be borne in mind on sites of this nature that ultimate responsibility for safety lies with each contractor and employer of labour including, of course, all the individual sub-contractors. The Site Safety Committee provides a co-ordinating role and its effectiveness depends on the enthusiasm with which its recommendations are followed through.

138. It is of interest to note that the Central Electricity Generating Board have prepared and have in use a document giving guidance on safety organisation on power station sites and that recently they have advised the industry that they themselves propose to appoint a site safety supervisor at all future power station sites and, as far as is practicable, at existing sites. The object is to facilitate the application of a common policy towards safety matters. The functions of the Board's site safety supervisors would be advisory, as are those of the present joint safety supervisors. Such appointments will in no way release contractors from their statutory obligations for safety.

Conclusion

139. A well organised site safety committee can provide the necessary co-ordinating role on a site with a number of contractors and sub-contractors. It needs to be led effectively and a system evolved for ensuring that its recommendations are carried out. Particular care is necessary to ensure that information is passed down the line of authority to the smallest sub-contractor.

Safety training and propaganda

140. The training and propaganda provisions on the large sites could at best be described as sketchy. The greatest efforts were to be seen at the power stations. As mentioned earlier in the report, both the stations promoted a safety week. Both also initiated first-aid training courses. At site no. 2 rescue training and fire-fighting training were also given mainly to CEGB men who would become part of the permanent staff of the station when it became operative. Some use was made of posters on both stations. On site no. 2 a Training Within Industry course, job safety was initiated following discussions between the resident engineer and the manager of the local employment exchange. The team had some discussion with course members and met the course instructor. Those attending found the course both interesting and beneficial. The team formed the opinion that the introduction of TWI on sites of this type was a very worthwhile venture and repaid the special effort necessary to enable senior site personnel to attend.

141. At site no. 5 there was no recognised training or supervision but the firm had appointed a training officer before the end of the survey period and organised training was expected to be effective by the end of 1966. Site no. 8 had no training at site level and little use was made of any propaganda methods though the firm had an interesting experiment in mind which they intended to try on two sites. Briefly this was to issue the necessary protective gear to site personnel and to allocate each employee a number. If his number was drawn in a weekly draw he would be checked to see whether he was using the right protective clothing. If he was not, then the £1 prize money would be added to the prize for the winner of the following week's draw.

142. Site no. 9 used no propaganda and gave no site training to personnel although the firm's safety supervisor had meetings with senior site personnel to discuss safety measures. At site no. 12 typed notices with an overprint of the word SAFETY setting out a description and analysis of accidents, were posted at vantage points and changed fairly frequently. There were no obvious training or propaganda methods used on other large sites.

143. Within the Group Safety Supervisor Scheme efforts were made to ensure that all site foremen were well instructed and RoSPA posters (some of the members of the Group were members of RoSPA), departmental leaflets, copies of new Regulations, legal decisions and printed instructive posters were distributed to group members. The Group Safety Supervisor took advantage of the winter weather to instruct senior site personnel in safety matters and legal requirements. This was usually carried out in the site huts but at the time of the survey there was no organised training aimed at employees below foreman level. A special meeting of the group members was called to discuss the shared welfare provisions of the new Construction (Health and Welfare) Regulations 1966 and an advisory leaflet was circulated.

144. Among the firms in the comparable group, some contractors periodically sent the site agent or a foreman on one of the recognised safety supervisor courses at the Construction Industry Safety Training Centres but propaganda was missing at the sites and head offices and training was not found to be organised for workers below foreman level.

145. The team found that most safety supervisors had a desire to organise training and to devise schemes for education of site personnel in safety matters. In many cases they received no encouragement from management. In others little progress was made as the safety supervisors were uninformed about propaganda material available such as posters and films and about the means of obtaining it. This was particularly so where the firm was not a member of an employers' federation or of a safety organisation since these bodies offer an advisory service to their members.

Conclusion

146. In general the position regarding safety training and safety propaganda was not very encouraging. Safety supervisors usually had a desire to organise training and to devise schemes to put out propaganda aimed at safe working methods but they received little support from management in many cases. Many of them were not well-informed about the methods of obtaining propaganda material. Consideration should be given to a wider use of TWI courses for improving site supervision.

Trade union participation

147. During their visits to sites the team formed the impression that trade union participation in the organisation of safety at site level was limited but acknowledged that it was, in any case, difficult to determine. One of the difficulties was the frequent movement of work-people from site to site. At power station no. 2 where the trade union representatives had been together for some time, they had become knowledgeable on safety requirements and were more able to assess standards required.

148. In the course of enquiries into training arrangements with the director of a large safety training centre it was found that, apart from a few shop stewards sent on safety courses by their employers and some who attended free courses organised at week-ends by the training centre, no course members had been recorded as trade union representatives. On the other hand, other enquiries revealed that the trade unions concerned with the construction industry made local efforts to organise lectures and show safety films using, in some cases, facilities and personnel provided by RoSPA. The aid of the factory inspector was also sought when possible.

149. At the start of the survey the team attended a monthly meeting of the district organisers who represented the majority of the trade unions concerned with the constructions industry in the immediate vicinity of the survey sites. They discussed the purpose of the survey and asked the organisers if they would review the problem during the period of the survey and report their findings in due course. The team attended another meeting at the end of the survey period when the following general views were expressed by the Chairman:

- (1) In general, the spirit of regulations 5 and 6 of the Construction (General Provisions) Regulations 1961 was not being complied with.
- (2) Supervisory staff often failed to ensure that there was full compliance with Safety Regulations particularly by the employees of sub-contractors.
- (3) There was insufficient inspection by HM Factory Inspectorate.
- (4) Breaches of the Regulations should attract larger penalties in the courts than was the general rule.
- (5) Absence as a result of minor accidents could be reduced by better post accident treatment on the site.
- (6) Conditions on sites would improve if safety supervisors were appointed by a central government department rather than by the contractors themselves.
- (7) The cost of safety on any particular project should not be included in the tender for the contract but should be independent and separately assessed. In this way it was hoped that contracts would not be let to those who persistently neglected to allow for adequate scaffolding etc.
- (8) Where it was necessary an injured man could now afford to be absent from work and return in comfort, perhaps at the end of a week, instead of having to return to work in discomfort in three or four days, so risking another accident (possibly involving others) through lack of fitness.
- (9) While the number of serious accidents which union officers are required to investigate appears to be decreasing, the number of minor accidents involving claims appears to be increasing.
- (10) There was a need for the formation and periodical meetings of safety committees on the larger sites.
- (11) There should be organised training of scaffolders and a qualified scaffolder should have some evidence as to his qualifications.

(12) Some crane drivers and banksmen did not have the necessary qualifications and it was not uncommon for unskilled men to be employed on these duties.

(13) The construction worker needs to have background information to enable him to understand legal requirements and their purpose, otherwise he is unlikely to pay attention to suggestions made to him concerning safe working methods.

Conclusion

150. There was considerable interest in safety problems amongst trade union district officials but trade union participation at site level was limited.

Differences in the accident incidence rate between large and small firms

151. Appendix 4 sets out the incidence rate per 1,000 employed for each of the large sites and the local authority and also for the group scheme and comparable group taken as a whole. For purposes of comparison the average incidence rate (30.3) for the survey area for the six months period is shown and it will be seen that firms within the group scheme and the comparable group are below this figure with averages of about 22. A more detailed analysis of the group scheme figures shows that ten of the firms, none of which employed more than 50 work-people, did not have a reportable accident during the period of the survey. It only needs one reportable accident, however, to send the rate for such a firm well above the average, and two small firms thus had recorded rates of 36 and 53. These two firms together with two others with 2 accidents each were the only ones in the group scheme where the average incidence rate figure of 30 was exceeded.

152. A significant difference within the comparable group is that while nine firms did not have a reportable accident, the four firms which exceeded the average, did so by a greater margin than in the group scheme. None of the firms employed over 60 yet one had 8 reportable accidents, a second had 4 and a third 3 and a fourth 2. This points to the value of a group scheme in keeping standards at a reasonable level because as indicated in paragraphs 88 and 91 action can be taken by the Group Committee to improve the position on the poorer sites.

153. It will be noted from Appendix 4 that amongst the larger sites there were some where the numbers employed might suggest that the contractors were only small firms. In fact they were all sites where the labour forces were those of firms also operating other sites, and it would be wrong to infer that the incidence rate shown for the site related to the complete labour force of that firm. Nevertheless, taking the industry as a whole the evidence available from the survey shows that on average the smaller firms contribute less to the reportable accident figures than the larger firms and their sub-contractors.

Conclusion

154. Evidence available indicated that while there were exceptions, on average smaller firms had a lower accident incidence rate than larger firms and their sub-contractors.

The success or failure of the safety organisation—a general conclusion

155. The effectiveness of safety organisations varied considerably and all of them, even the best, could have been improved. Perhaps the most complete safety organisation encountered was that on power station site no. 2 followed reasonably closely by the Group Safety Supervisor Scheme. In both these organisations there was an element of disciplinary supervision which was not really present in any of the other safety organisations. In the group there was a possibility of being expelled from the scheme for failing to uphold the aims of the group and to fulfil the articles of association. On the power station there was a threat of reference to higher level if firms failed to take the action recommended by the Safety Committee.

156. The team met contractors who genuinely had the safety of their employees at heart. They also met some contractors who genuinely felt their standards were good even though in fact their sites were only very average. These contractors did not know the Regulations themselves and to this extent were hampered in forming a clear judgment. The team also met contractors who thought that they had discharged their duty if they arranged for a group safety supervisor or consultant to visit and inspect without arranging for a check to be made that the recommendations had been followed on the site. In the opinion of the team the key to the situation is undoubtedly a positive safety policy, the appointment of an effective safety supervisor and the backing he receives from management, followed by adequate training at site level starting with site agents and foremen.

157. In general, the team formed the impression that the safety supervisor has achieved only a very small measure of the success which might have been expected from the requirements of the regulations 5 and 6 of the Construction (General Provisions) Regulations 1961. In many cases the safety supervisor was regarded by the team as satisfactory on the job he was supervising but there was limited evidence of background training and experience which would enable him to move with ease from, for example, a house building site to a complex civil engineering site and be as effective.

158. There was little evidence that the safety supervisor and his senior management were taking action to prevent those accidents which could be attributed to human error, such as failing to exercise good judgment or to take care. A safety organisation also needs to make an impact on practices which lead to injuries such as the sprains and strains resulting from manual lifting and injuries due to falling materials caused by bad stacking. Also many accidents caused by handling or tripping, if investigated at the time of the accident, would reveal poor or unsafe methods of work. This positive approach to accident prevention can only be followed if employers ensure that all accidents are notified to safety supervisors, whether the supervision is by a direct employee of the firm, a group safety supervisor or a safety consultant.

159. An adviser to a company needs far more than a two-day course at a Safety Training Centre if he is to attain a level of knowledge and experience which will allow him to perform his duties effectively. He should be of some standing in the industry, so that he can effectively

influence management regarding the avoidance of hazards which lead to accidents and subsequent disruption of production. The team thought that if this was to be achieved the industry should undertake a comprehensive reappraisal of the status, functions and conditions of employment of safety supervisors.

PART V SITE LABOUR PROBLEMS

Effect on site safety of labour turnover and the employment of inexperienced labour

Labour turnover

160. It was decided at the beginning of the survey period to attempt to calculate the labour turnover for each site basing the calculations on those used for obtaining labour turnover rates for various industries as published in the Ministry of Labour Gazette. Contractors were asked to keep details of the numbers employed at the beginning and end of every four week period and also of the numbers on the payroll at the latter of the two dates who were on the payroll at the earlier date. It was soon found that the majority of sites did not have the administrative machinery to deal with such an exercise. Even if the figures could have been obtained it was doubtful whether they would have given a true indication of turnover, since they would have included personnel recruited not to replace wastage which had taken place, but because a certain phase of the contract had been reached when extra labour was necessary, i.e. the increase in the numbers on a site would not necessarily have indicated an overall increase in a firm's labour force but would have included permanent staff and other workers transferred temporarily or otherwise from other sites on which the firm had contracts. An attempt was made, however, to total those personnel who had been recruited to fill a vacancy caused by wastage and the results are shown in Appendix 2. Wastage on a four weekly basis totalled 736 for the whole of the survey area and against an average employment figure of 8,925 this represented 8.2 per cent or over three times that experienced for male workers in factories.

161. On the whole the labour turnover tended to be highest on sites situated in highly populated areas or in areas where alternative employment was not hard to find. It is not possible from the evidence of this survey (see Appendix 2) to reach any conclusion which relates accidents to labour turnover. For example, the power station sites nos. 1 and 2 support a view that there is a greater chance of an accident occurring on a site where there is a high labour turnover. On the other hand, it is possible to point to other sites or groups where the figures contradicted this statement, for example, the comparative group no. 14 had a high labour turnover but yet produced only two more accidents than the group scheme no. 13 where the labour turnover was moderate.

162. The constant turnover of staff on site does create an atmosphere of instability which is not conducive to safe working. Certain medium-sized contractors within the group scheme were questioned on the reasons for

their comparatively low accident figures. A number of suggestions were put forward but almost without exception they commented on the fact that the majority of their men had been with them for some time and understood each other's way of working. A certain team spirit had been built up. It was agreed that it is probably easier for a small to medium sized contractor to build up and to maintain a permanent labour force.

Conclusion

163. There was no conclusive evidence to relate incidence of accidents to labour turnover but the efforts of some contractors who attempted to instruct inexperienced employees on site hazards tended to be nullified by site labour turnover.

Inexperienced labour

164. It has already been noted (see para. 41) that a larger number of accidents occurred to employees classed as labourers and it will be seen from Appendix 20 that over half of the total of 270 accidents occurred to persons who had less than a year's site experience. The two road projects and the power stations created a demand for labour in an area which had been predominantly agricultural or mining with the result that many men were starting their employment in the construction industry as labourers on large sites without knowledge or experience of the hazards they might meet.

165. It became clear during the survey period that many firms had no effective system of vetting labour before engagement. While certain firms did engage men through the local employment exchanges a large number of men were taken on at the site office where no attempt was made to check on their suitability and experience or any disabilities which might affect their work. This method of engagement can lead to problems especially when scaffolders, machine operators and crane drivers are being employed. There were exceptions, however, where contractors demanded that each applicant before employment completed a questionnaire showing details of his past employment, his injury record and any disability from which he might be suffering. The contractors adopting the written method of application for employment felt that it was far more difficult to withhold information on paper than it was during conversation.

166. While certain individual contractors attempted to instruct their inexperienced employees on site on the hazards they might meet, their efforts were often nullified by the high labour turnover. One of the larger contractors under survey arranged for the safety supervisor to give a site lecture to 300 employees. Four weeks later there were only ten men on site who had attended the lecture. This points to a need for training to be undertaken on an Industry basis. In this connection, some facilities are already provided by the Construction Industry Training Board. Central training does, however, need to be supplemented by some training on site. (Ministry of Labour TWI courses are available for presentation on sites.) It is believed that when a greater measure of training is achieved, together with a greater stability of labour, accidents will be reduced.

Conclusion

167. Over half of the reportable accidents on survey sites occurred to persons with less than 12 months site experience. Methods of recruitment and training of new entrants from labourers upwards need consideration at industry level.

Safety and the Sub-Contractor

Multiplicity of sub-contractors

168. Multiplicity of sub-contractors was most noticeable on the power station sites and on the redevelopment site no. 8. A number of accidents could be attributed either to the direct or indirect intervention of some factor involving the men or work of some other contractor. The remaining sites caused no problems so far as multiplicity of contractors was concerned.

169. In dealing first with the power station sites (nos. 1 and 2) it was estimated that at any one time there were as many as 30 contractors working in close proximity to each other on widely varying work. A typical example was in the turbine house where the following types of work can be undertaken within a restricted area :

- (1) installation of turbines.
- (2) lagging of steam pipes.
- (3) installation of pipework.
- (4) painting.
- (5) floor tiling.
- (6) wall tiling.
- (7) electrical installation of conductors.
- (8) installation of valves and steam control gear.
- (9) fitting of permanent walkways, platform and railings.
- (10) crane erection.
- (11) erection and dismantling of scaffolds.
- (12) installation of meters and recorders.

170. Many of these contractors will be using scaffolds erected primarily for other contractors and ladders and other gear found on the job but belonging to others. Some of the scaffolds may be waiting dismantling or already be partly dismantled. For example a scaffold erected for fitting of valve gear or for wall tiling will be used by electricians installing cable, and scaffolds will be altered or partly dismantled, usually without the permission of the person who erected them, to allow the installation of runs of steam pipe or stairways. Again gear intended for erection at some overhead point will be laid out in order on the ground below. This may, and often does, present a hazard for those who have been using the area as a walkway. It did in fact produce accidents. Electric arc welding takes place in positions where shielding is almost impossible and this also produced an injury. It is clearly very difficult to cope with such a situation as this but the "area of responsibility" system used at power station no. 2 was considered by the survey team to be instrumental in promoting control and in leading to a reduction in hazards and accidents.

171. The survey team comment that some sub-contractors' staff act in a way which does not cause hazards for others but even where agents and chargehands were found to be actively safety conscious their efforts were sometimes weakened by workmen taking chances. The team were of the opinion that training could play a big part in reducing the number of accidents where a multiplicity of contractors is unavoidable.

Differences between large and small sub-contractors.

172. The survey team attempted to make a comparison between large and small sub-contractors since within each category standards varied, and have the following observations to make:

The large sub-contractor

- (i) Is usually likely to employ a safety supervisor full or part-time.
- (ii) If he is concerned with heavy structural work he will have a site agent with a reasonable knowledge of safety legislation. On the other hand if he is concerned with ancillary work such as electrical or plumbing work there may be no site agent or other person with knowledge of Regulations.
- (iii) He is more likely than the small sub-contractor to employ local unskilled labour, with a greater liability to produce more accidents.

The small sub-contractor

- (i) Usually has no safety supervision and little knowledge of the Regulations.
- (ii) Is usually concerned with specialist trades employing a high proportion of skilled labour. If these are the basic trades such as roofing, bricklaying, wall tiling or plumbing his men go out as a gang with a senior hand.
- (iii) He is unlikely to employ local unskilled labour and is less likely to produce accidents.

They were unable to reach a factual conclusion owing to the limited nature of the survey.

173. Generally sub-contractors have few men on a site. Indeed without careful enquiry the exact size of the firm may not be known but it may well reveal that 40 or 50 men are employed continuously on widely dispersed contracts. It is true to say that in most cases the degree of experience and the intelligence of the men employed is well above the average. Nevertheless they do have accidents and insofar as the employer fails to provide adequate safety supervision he is in breach of regulation 5 of the Construction (General Provisions) Regulations.

174. Sub-contractors on large contracts were usually asked to and expressed a willingness to carry out the main contractor's recommendations regarding safety arrangements. In the case of a sub-contractor nominated by a developer it was usually found that despite his greater independence he matched the level of compliance of the site as a whole. The latter type of sub-contractor, particularly in the construction of system built schools, often moved from site to site with the same main contractor and developed mutually acceptable working arrangements.

Conclusions

175. There is difficulty from a safety point of view in controlling the activities of work-people employed by sub-contractors where they are present in very small numbers or individually on sites. Effective basic training of such employees in safety measures is essential.

176. Additionally, special action is necessary to keep a constant check on safety measures on sites where a number of contractors and sub-contractors have employees working in a relatively small and sometimes confined area. An initial step could be to make one contractor responsible for co-ordinating safety in that area.

Self-employed labour-only sub-contractors

177. There were 277 self-employed labour-only sub-contractors on the sites subject to the survey and in all cases they were employed as small gangs of two, three or five persons in tiling, bricklaying, joinery and plastering. One or two self-employed electricians were also encountered. Usually the labourers were members of the gang but self-employed gangs of labourers only are not unknown (although none was found during the survey) particularly in trench work, foundations preparation and the like. Most of the self-employed labour-only contractors (232) were working in the comparable group no. 14 and within this group they were principally employed by three contractors who had 146 between them.

178. There were no accidents resulting in loss of time, apart from treatment time, to any of the self-employed men and only one person was known to have had time off site for treatment. The team made enquiries to ascertain whether the workers had had accidents which had not been reported because they were not "employed persons". The team was assured by foremen and supervisors concerned that they did not differentiate between employed and self-employed persons when reporting accidents.

179. The team took every opportunity of discussing self-employed labour-only sub-contractors with employers, the trade unions and the men themselves. A number of points of view were found to be generally accepted by all parties as follows:

- (1) If they can avoid it the gangs will not spend time in taking precautions such as erecting guard-rails and toe-boards whether or not they had a statutory duty to do so.
- (2) The gangs ensure that they always have an adequate supply of materials and in some cases this results in a clutter of material too close to the work giving rise to inadequate means of access. Bricklayer gangs tended to overload scaffolds.
- (3) Self-employed men rarely have accidents.

180. The team's opinion about the absence of accidents was that as self-employed labour-only sub-contractors on the survey sites were employed on housing or bricklaying work up to a height of two storeys they were not exposed to the same hazards as they would have been if employed on larger contracts. There is no doubt that where there was failure by these contractors to observe the requirements of the Regulations, an employed man

could have been put at risk because of this failure but normally the only persons at risk were the labour-only sub-contractors themselves and possibly the site agent or clerk of works overseeing the work done. There was no evidence that anyone was injured as a result of an act or omission by a self-employed labour-only sub-contractor. The foreman in charge of the site where there was a substantial use of bricklaying gangs said that he had to be firm with the men in getting them to tie ladders and to use toe-boards. The gangs erected their own scaffolds and these were well constructed. There were also joiners who were self-employed on the site and here again the foreman stated that it was an uphill job to get the guard-rails replaced after roof timbers had been raised for placing. However, this difficulty with joiners was noticed on other sites. Little difficulty appeared to have been experienced with tiling gangs and none with the plasterers and electricians. The team had only very limited experience of the work of self-employed plumbers but it was noted that they tended to work a lot from ladders which they did not always tie and secure.

Conclusion

181. The sample was too small to try to draw general conclusions. On the survey sites there were no reportable accidents to self-employed labour-only contractors which caused them to be absent for more than three days and these sub-contractors did not cause accidents to employed persons. Most were working on housing sites and failure to comply with safety legislation meant that apart from themselves often only the site agent or clerk of works overseeing them was at risk.

PART VI PROTECTIVE CLOTHING AND FIRST AID

Provision and supply of protective clothing

Safety helmets

182. Nationally scalp-injuries accounted for 1,179 accidents in 1965. A study of the accidents reported from the survey sites showed that ten men received head injuries when they were either struck by objects falling from a height, or collided with a stationary object. In one case the worker died. In none of the ten instances was the injured person wearing a safety helmet although helmets were available and the use of one might have prevented or minimised the injury. Eight of the ten accidents occurred on sites where major industrial or multi-storied buildings were under construction—the type of site where it should have been foreseen that such an accident might have taken place. A comparison between power station sites is inevitable. At one station, hard hat areas had been clearly designated, and with one or two exceptions all employees wore safety helmets within these areas. The site produced one accident, the fatality mentioned above, where a man was struck on the head. At the other station there were no designated hard hat areas, and employees, with the exception of those of one contractor who made the wearing of a safety helmet a condition of employment, appeared to wear helmets as and when they wanted. The site produced five accidents involving persons being struck on the head. When questioned employees gave various reasons for

not wearing helmets but the most common was that the helmets were too hot in warm weather. They appeared quite willing to wear helmets in the winter.

183. On other sites there were always the converted few who wore safety helmets continually whilst they were on the site, but although the helmets were available, the general impression gained from the sites under survey was that the majority of employees did not wear them and that any effort at persuasion was a token one only.

184. On a number of sites it was suggested to the team that propaganda and persuasion were not effective weapons in the battle to secure the widespread use of protective headgear and that the problem might be solved by making the wearing of helmets a condition of employment. It is significant that the best results were obtained on a site where careful thought had been given to the matter and where it had been realised that there were certain areas on site where the wearing of a helmet was not really necessary. A better response had been obtained by isolating danger areas rather than by insisting on the continual use of helmets throughout the site.

Protective footwear

185. There were nineteen accidents reported where employees were injured when they were struck on the foot by various objects. There were also 16 accidents caused by pieces of timber with projecting nails. These 35 accidents, nearly 13 per cent of the total reported, could have been prevented or the injury minimised had the persons involved been wearing the correct type of protective footwear. Nationally some 4,000 accidents were due to this cause in 1965.

186. There were arrangements on most of the large sites for purchasing protective footwear. On one site, as mentioned in paragraph 132, a substantial number of safety boots had been sold over a period of two years and there had been a noticeable decline in the number of foot injuries. Quite a number of contractors assisted employees in the purchase of boots by enabling them to contribute a small weekly sum towards the cost.

187. The type of footwear normally provided by the contractor was the rubber boot for wet weather working which usually had neither protective insole nor toe-cap. Certain contractors have said that a rubber boot that combines protective insole and toe-cap is too heavy for continual wear. If this is so further consideration should be given to the problem by manufacturers.

188. It appeared that the propaganda campaign directed at persuading employees to wear safety footwear has had more success than that aimed at persuading them to wear safety helmets. There was, too, the consideration that employees were finding that the purchase of safety footwear was a good economic proposition. However, there was a certain section of the labour employed in the construction industry (normally the floating unskilled population who drifted from site to site) who were generally most inadequately shod for the type of work they had to do, a type of work which was most likely to lead to foot accidents.

Conclusion

189. Many accidents might have been prevented if safety helmets and protective footwear had been worn. With one exception propaganda and persuasion on the sites had failed to secure the use of protective headgear. In the one case there was evidence that safety helmets would be worn if particularly dangerous areas were identified and within these areas the wearing of helmets made compulsory.

First Aid

Facilities for immediate treatment

190. All sites occupied by contractors in both the Group Scheme and comparative group were provided with first-aid boxes which were well stocked. These were normally kept in the foreman's office but some were kept in less suitable places and careless handling resulted in the contents becoming soiled.

191. Both power stations (sites nos. 1 and 2) had first-aid rooms; on site number 1 the first-aid room was staffed by a State Enrolled Nurse and on the other by a State Registered Nurse. Outside normal working hours there was adequate cover by personnel trained in first-aid treatment. This coverage was also effective during the absence of either of the nurses. One power station site had an ambulance provided by joint contribution from the various contractors. Three other large sites nos. 7, 8 and 12 had first-aid rooms staffed by trained persons who were virtually in full-time attendance at the first-aid room. The remaining seven large sites had employees working on site who were trained in first aid. Treatment was normally carried out in a site office which was not specifically set aside for the purpose. There were few sites in groups 13 and 14 where the numbers employed exceeded 50. It was found, however, that on many sites where the numbers employed were less than 50, there were persons who were trained in first-aid treatment. It was encouraging to note that many contractors were attaining a standard above the minimum standard laid down in the Construction (Health and Welfare) Regulations 1966.

192. The normal practice on sites was to send injured persons to the casualty department of the local hospital, unless the injuries were minor cuts and bruises. This is not a practice to be criticised since the first-aid man on site is trained only to give first aid in the true sense of the word. There are two points of interest concerning hospital treatment, however, which could have an effect on the number of accidents reported from sites.

193. It was the practice on one large site to send all personnel suffering from nail puncture wounds to the local hospital for anti-tetanus and penicillin injections. It was normally found that these men returned to work and did not lose any time. On the other hand, certain employees either refused to attend hospital or did not report to the first-aid room, but consulted their own doctor. Almost without exception these employees lost enough time for the accident to become reportable.

194. On another large site where a high percentage of immigrant labour was employed, the same practice of sending employees to the local hospital was adopted in cases of foot puncture wounds. After treatment the injured persons were quite often told by the hospital authorities to return in a week's time for observation. Although they were apparently considered fit for work and were not given any medical certificate, no definite instructions, apart from the instruction to return to hospital, were given to the injured person. It was found that immigrant labour, probably through misunderstanding, then stayed away from work until they had made their return visit to the hospital, again with the result that the accident became reportable.

Facilities for subsequent treatment

195. Facilities for subsequent treatment of injured persons were provided only on the power station sites. It is difficult to assess what percentage of minor accidents on site were prevented from becoming reportable because the employee took advantage of the "on site" facilities for subsequent treatment. It is the team's opinion, however, that if suitable on site treatment were available a number of minor accidents which in themselves are not disabling but which cause absence because subsequent treatment is being sought elsewhere, would be prevented from becoming reportable. There was no real evidence to support this opinion from the sites under survey with the exception of the power station sites. On these sites a number of men suffering from nail puncture wounds took advantage of subsequent on site treatment and stayed at work, whilst on other sites where no such treatment was available, men suffering from apparently similar injuries absented themselves to secure treatment.

196. The director of a large contracting firm developing one of the sites under survey, outlined a scheme being operated by his firm in another part of the country. The firm have contracted with a team of doctors and nurses to supply a medical service to all the firm's sites within an area. The medical team are always on call in the event of an accident, but what is more important is that the service includes a daily site visit by a qualified nurse to carry out post accident treatment. This scheme has been operating with success for some months and is appreciated by employees. The firm has found that when one of their sites in the area has been nearing completion, employees have approached the supervisory staff requesting transfer to another site in the area where the medical service is available. Lost time following accidents has been reduced and this alone has offset the cost of joining the scheme.

Conclusion

197. It was generally found that the facilities for immediate first-aid treatment on the sites were adequate. Whilst the provision of good facilities for the subsequent treatment of injury will not reduce the number of accidents occurring on site, such facilities can affect the amount of time lost after an accident. Where industrial health schemes are in existence the team considered that employers should be encouraged to join.

PART VII STATUTORY REQUIREMENTS

Assessment of compliance with statutory requirements and possible effects of full compliance

198. A study of the reportable accidents investigated by the team showed that fifty of them could probably have been prevented had there been full compliance with the Regulations at the time of the accident (see para. 16). Beyond this it is extremely difficult to assess the possible effects of full compliance with the statutory requirements. It is impossible to say how many accidents were avoided as a result of observance of Regulations. There were at least 2,900 other accidents which did not give rise to an absence from work of more than three days (see Appendix 3) but the team did not have the time to investigate them to assess compliance with statutory requirements.

199. The survey team considered that with few exceptions the standard of compliance with the statutory requirements was average as measured against their general experience, and in certain cases above average, yet there were 270 reportable accidents. In their view there can be no doubt that on the sites visited there has been a general improvement in compliance with those requirements designed to prevent falls. The publicity given to these particular requirements over the past years has obviously had some effect but as indicated in paragraph 20 this is not necessarily typical of the country as a whole. It was noted too that there was an increasing awareness of the requirements affecting cranes and other lifting machinery. The accidents reported from the sites which involved lifting machinery were mostly caused by persons being struck by the load, rather than by any failure of the lifting machine itself.

200. It was thought at the beginning of the survey period that the frequent visits that were to be paid to the various sites and the knowledge by the contractors that subsequent visits were inevitable, might lead to an abnormal improvement in compliance with the statutory requirements. Accordingly a careful note was taken of conditions noted on the first visit and an attempt made to assess any subsequent improvements. Initially there was an effort on the part of most site agents and foremen to ensure that they were observing statutory requirements when the team visited. As the survey progressed, however, and it was realised that the aim of the team was to collect information rather than to enforce statutory requirements, the air of suspicion disappeared. The obvious efforts initially shown were relaxed without any marked deterioration in site conditions. The team felt, however, that the frequent visits of inspection to sites did help to maintain compliance at a higher level. There were instances of sub-contractors being warned by main contractors on their arrival at site that because of the visits being paid to sites by inspectors their methods of work and behaviour generally must be beyond reproach. The effect of the frequency of visits to sites by inspectors was a factor that has to be taken into account in reading the report.

201. The question was considered whether some at least of the 220 accidents not caused by clear breaches of the present Regulations would have been prevented had the legislation been more comprehensive. The conclusion reached, assuming that the difficulties of enforcement could be overcome, was

that possibly 16 per cent could be covered by additional legal requirements concerning the use of safety boots and helmets. It was not felt that the remainder of the 220 could be dealt with this way because the causes were mainly those associated with methods of work, site tidiness and human failure. To prevent this type of accident action is necessary within the industry itself. For example where the basic causation is human failure the requirements are a more comprehensive system of training and a positive move on the part of employers to inculcate in workmen a sense of the need to work safely. The team felt that having regard to the wide variety in standards encountered (see paragraphs 82 and 157-159) regulations 5 and 6 of the Construction (General Provisions) Regulations 1961 concerning safety supervisors should be reconsidered with the object of giving them a more specific content.

Conclusion

202. The team assessed the standard of compliance with legislation as average and in some cases above average, yet there were 270 reportable accidents. Assuming that the difficulties of enforcement could be overcome they considered that 16 per cent could have been avoided by the introduction of additional legislation covering the use of protective clothing to guard against head and foot injuries. There was also need for a review of the adequacy of regulations 5 and 6 of the Construction (General Provisions) Regulations 1961 concerning safety supervisors. Action is necessary by the industry to deal with accidents caused by faulty methods of work, site tidiness, and human failure which together accounted for about two-thirds of the reportable accidents.

Knowledge of the Regulations and methods of compliance

203. In general higher management relied on the advice of their safety supervisors. This did not mean that higher management were completely ignorant of the statutory requirements, but their knowledge was sketchy. They knew of the requirements to tie ladders, to fix guard-rails and toe-boards, and to a lesser extent to cover holes in flat roofs. They were aware of the requirements regarding lifting machinery, but were otherwise not well informed.

204. The knowledge of the regulations on the part of site supervisors varied. On the survey sites it was found that the agents on the larger sites had the better understanding of the requirements but on the smaller sites there were some foremen who had received some instruction and were comparatively well-informed. There were other foremen, however, whose knowledge was very limited and who considered that full compliance with the statutory requirements meant virtually only the erection of a guard-rail in appropriate situations. While higher management can and must formulate a firm's general safety policy, the success of the policy depends to a large extent on the immediate site supervision. The site agent or foreman is a key figure. It was noted in the two groups nos. 13 and 14 where a number of sites operated by the same contractor were under survey, that there was on occasions a marked difference between sites which could only be attributable to the attitude and influence of the respective foreman, since the type of work being

carried out was identical. One site in particular produced over half the accidents reported by one contractor. The working conditions on this site were atrocious and were caused solely by the foreman's inability to come to grips with the problems that faced him. On the other hand another contractor, whose sites had a high labour turnover, reported only one accident. It was found on these sites that the foremen were keen and vigorous in their attempts to gain safe working conditions. It was later discovered that each of these foremen had attended a two-day safety course at a recognised safety training centre. A number of foremen and agents were seen who had attended such courses and there was obvious evidence on site that the courses had had some effect. The foremen on sites in the group scheme had also benefited from the tuition received from their safety supervisor though the older foremen were finding it difficult to adjust their methods of working. The foreman's influence on site cannot be too greatly emphasised.

205. Apart from the need for improved background knowledge the survey team considered that the education of higher management and site supervisors in the statutory requirements and safe methods of working could be improved by greater use of advisory material such as the leaflet published in 1965 about work near overhead electric lines. The magazine "Safety" produced by the British Iron and Steel Federation was also praised by certain contractors and the opinion expressed that a similar type of publication produced by the construction industry would be an effective method of disseminating propaganda and information.

Conclusion

206. Knowledge of the Construction Regulations was found to be limited. It is vitally important that site supervisors should have a thorough knowledge of legislation and that higher management should be willing to take notice of the advice of their safety supervisors. Consideration should be given to a greater use of leaflet type publications dealing with particular problems and to the publication by the industry of its own safety journal.

APPENDIX 1

Accidents reported to HM Factory Inspectorate for Great Britain for 1960-65 analysed by process and showing indices used 1960 as base 100

	1960	1961	1962	1963	1964	1965
TOTAL	190,366(675)	192,517(669)	190,158(668)	204,269(610)	268,648(835)	293,717(827)
INDEX	100	101.2	99.9	107.4	141.2	154.4
FACTORY PROCESSES ...	161,324(354)	161,655(368)	157,600(351)	168,106(332)	217,950(344)	239,158(358)
INDEX	100	100.1	97.6	104.1	134.9	148.1
CONSTRUCTION PROCESSES ...	20,584(277)	23,356(264)	25,338(281)	28,348(242)	40,491(271)	44,381(230)
INDEX	100	113.5	123.1	137.7	196.7	215.6
DOCK, WHARVE, QUAYS AND INLAND WAREHOUSES	8,158 (44)	7,596 (37)	7,220 (36)	7,815 (36)	10,287 (40)	10,178 (39)
INDEX	100	92.0	88.5	95.8	125.1	124.8

Note: The figures in brackets are fatalities included in the accident total.

APPENDIX 2

Sites and firms included in the Survey

Statistics for the period 1st January 1966-30th June 1966

Code no.	Type of site	Stage of construction	Average number employed	Estimated* labour turnover	Number of reported accidents
1	Power station	early ...	1,650	943	73
2	Power station	late ...	2,069	258	43
3	Local authority housing site	middle/late ...	160 (6)†	120	7
4	Private housing site ...	middle ...	38 (9)†	12	—
5	Office block	early/middle	97	30	8
6	Local authority flats ...	early/middle	82	36	8
7	Local authority develop- ment—flats etc.	early/middle	250	191	15
8	Private development flats, etc.	middle/late ...	402 (6)†	666	19
9	Road	early/middle	330	180	10
10	Road	middle/late ...	511	457	16
11	Sewage scheme	middle ...	45	26	3
12	Factory reconstruction ...	middle/late ...	86	131	2
13	Group of 20 firms covered by Group Safety Officer Scheme	—	1,231 (24)†	287	28
14	Comparable group of firms not all covered by same Safety Officer	—	1,373(232)†	1,448	30
15	Local authority — direct labour force	—	601	negligible	8
	TOTALS direct labour force	... ..	8,925(277)†	4,785	270

* Restricted to terminations which were replaced.

† Number of self-employed labour-only sub-contractors included.

APPENDIX 3

Approximate accident frequency rates for the survey area per 100,000 hours worked during period 1st January 1966-30th June 1966

Code no.	Hours worked	Accidents				
		Reportable		Others*		Total
		Total	Frequency rate per 100,000 hours	Total	Frequency rate per 100,000 hours	Frequency rate per 100,000 hours
1	2,164,500	73	3.37	751	34.70	38.07
2	2,573,000	43	1.66	694	26.98	28.64
3	191,360	7	3.66	12	6.27	9.93
4	44,460	—	—	6	13.50	13.50
5	116,660	8	6.86	24	20.57	27.43
6	102,336	8	7.82	20	19.54	27.36
7	325,000	15	4.61	89	27.39	32.00
8	501,696	19	3.79	104	20.73	24.52
9	514,800	10	1.94	47	9.13	11.07
10	730,730	16	2.19	69	9.44	11.63
11	56,160	3	5.35	7	12.46	17.81
12	114,036	2	1.75	11	9.65	11.40
13	1,520,272	28	1.84	340	22.37	24.21
14	1,659,000	30	1.81	392	23.63	25.44
15	703,170	8	1.14	335	47.64	48.78
Whole of survey area	11,317,180	270	2.59	2,901	25.63	28.02

* Recorded in site accident books—not necessarily "lost-time" accidents as defined in para. 3 of the report.

APPENDIX 4

Accident incidence rate for the survey area per 1,000 employed for the period 1st January 1966-30th June 1966

Code no.	No. of employees	No. of reported accidents	Incidence rate for six months (i.e. per 1,000 employed)
1	1,650	73	44.2
2	2,069	43	20.8
3	160	7	43.8
4	38	—	—
5	97	8	82.5
6	82	8	97.6
7	250	15	60.0
8	402	19	47.3
9	330	10	30.3
10	511	16	31.3
11	45	3	66.7
12	86	2	23.3
13	1,231	28	22.7
14	1,373	30	21.8
15	601	8	13.3
Survey area	8,925	270	30.3

APPENDIX 5

REPORTED ACCIDENTS AND COMPLIANCE WITH STATUTORY REQUIREMENTS

Figures based on the conclusions of the Inspectors survey area for the period 1st January 1966-30th June 1966

Code no.	Breach	No breach	Total	No breach as percentage of Total
1	13	60	73	82
2	8	35	43	81
3	1	6	7	86
4	—	—	—	—
5	1	7	8	88
6	—	8	8	100
7	4	11	15	73
8	7	12	19	63
9	3	7	10	70
10	1	15	16	94
11	1	2	3	67
12	—	2	2	100
13	7	21	28	75
14	3	27	30	90
15	1	7	8	88
Total	50	220	270	81
Percentage of total accidents	19	81	100%	—

APPENDIX 6

[illegible]

APPENDIX 7

Reported accidents for the survey area for the period 1st January 1966-30th June 1966

Analysed by process and primary cause

Circumstances of accident	Building operations				Works of engineering construction			
	Fall of 6ft. 6in. or less	Fall of over 6ft. 6in.	Total of all falls		Fall of 6ft. 6in. or less	Fall of over 6ft. 6in.	Total of all falls	
	Total	Total	Fatal	Total	Total	Total	Fatal	Total
1. Falls of persons								
(a) from heights...	24	13	2	37	—	—	—	—
(b) falls on the flat ...			—	18			—	1
2. Falls of materials	11	11	1	22	—	2	—	2
3. Excavations ...			—	—			—	1
4. Tunnelling ...			—	—			—	—
5. Hoists ...			—	7			—	1
6. Machinery (other than hoists) ...			—	9			—	3
7. Fires and explosions of combustible material			—	2			—	—
8. Stepping on and striking against objects...			—	42			—	1
9. Hand tools ...			—	12			—	2
10. Rail transport ...			—	—			—	—
11. Non-rail transport			—	13			—	6
12. Electricity ...			—	1			—	—
13. Other accidents...			—	76			—	14
			3	239			—	31

APPENDIX 8

REPORTED NON-FATAL ACCIDENTS IN CONSTRUCTION PROCESSES FOR GREAT BRITAIN
FOR THE PERIOD 1st JANUARY 1966 TO 30th JUNE, 1966

Analysed by cause according to hazards in construction work

Circumstances of accident	Building operations			Works of engineering construction			TOTAL CONSTRUCTION		
	Fall of 6 ft. 6 in. or less	Fall of over 6 ft. 6 in.	Total	Fall of 6 ft. 6 in. or less	Fall of over 6 ft. 6 in.	Total	Fall of 6 ft. 6 in. or less	Fall of over 6 ft. 6 in.	Total
1. FALLS OF PERSONS									
From scaffolds, during erection, alteration or dismantling	52	86	138	3	8	11	55	94	149
From scaffolds due to collapse or failure of whole or part	60	95	155	8	3	11	68	98	166
From working platforms, gangways or runs of:—									
(a) trestle or ladder scaffolds	167	34	201	4	4	8	171	38	209
(b) other scaffolds	234	177	431	20	17	37	274	154	468
From cradles, boatswain's chairs, skips, etc.	5	3	8	—	—	—	5	3	8
From ladders or step ladders	507	407	914	22	17	39	529	424	953
Through openings in floors or walls, or from or down stairways	395	106	501	21	3	24	416	109	525
Through fragile roofing materials	28	140	168	1	2	3	29	142	171
From sloping roofs, etc.	25	108	133	1	1	2	26	109	135
During work on other sloping surfaces	7	3	10	1	1	2	8	6	14
From building structures under demolition	20	54	74	—	—	—	20	56	76
Into excavations	235	26	251	60	19	79	285	45	330
From structural frameworks during erection	13	49	62	2	8	10	15	57	72
From other working places, gangways or runs	233	125	348	17	10	27	240	135	375
From hoists or into hoistways	7	12	19	—	2	2	7	13	20
Into water	—	1	1	1	1	2	1	1	2
*Other falls from heights	335	145	500	76	23	99	431	168	599
TOTAL ACCIDENTS DUE TO FALLS OF PERSONS FROM HEIGHTS	2,343	1,571	3,914	237	123	360	2,880	1,694	4,574
Falls on the flat									
(a) due to stepping on or striking against objects			372			37			429
(b) whilst carrying or moving loads			941			148			917
(c) other						165			1,106
TOTAL ACCIDENTS DUE TO FALLS OF PERSONS			5,996			730			6,726

* Excluding falls from lifting appliances (other than hoists, which are listed). These accidents are included in machinery accidents (item 6).

Circumstances of accident	Building operations			Works of engineering construction			TOTAL CONSTRUCTION		
	Fall of 6 ft. 6 in. or less	Fall of over 6 ft. 6 in.	Total	Fall of 6 ft. 6 in. or less	Fall of over 6 ft. 6 in.	Total	Fall of 6 ft. 6 in. or less	Fall of over 6 ft. 6 in.	Total
2. FALLS OF MATERIALS									
From scaffolds during erection, alteration or dismantling
From scaffolds due to collapse or failure of whole or part
From working platforms, gangways or runs of—									
(a) timber or ladder scaffolds
(b) other scaffolds
From cranes, hoists, etc.
From ladders or step ladders
Through openings in floors or walls, or from or down stairways
Through fragile roofing materials
From steep roofs
From other slopes
From building structures under demolition
Into excavations
From structural frame-works during erection
From other working places, gangways or runs
From hoists
*Other falls from heights
Falls on the flat
TOTAL ACCIDENTS DUE TO FALLS OF MATERIALS

* Including falls from lifting appliances (other than hoists, which are listed). These accidents are included in machinery accidents (Item 6).

Circumstances of accident				Building operations	Works of eng. construction	TOTAL CONSTRUCTION
3. EXCAVATIONS				15	25	40
Buried by fall of material	...	...	...	41	40	81
Struck by material from the side (other than burial)	...	...	...
4. TUNNELLING				2	3	5
Buried by fall of material	...	...	...	5	25	30
Struck by fall of material from the top or side (other than burial)	...	...	...
5. HEIGHTS (excluding falls of persons and materials shown in Items 1 and 2)				11	...	11
Fall of platform or edge	...	...	...	42	1	43
Trapping by hoist	...	...	...	34	3	37
Other cause	...	...	...
6. MACHINERY (other than hoists)	...	...	...	1,140	445	1,585
7. FIRES AND EXPLOSIONS OF COMBUSTIBLE MATERIAL	...	...	...	89	23	112
8. STURFING OR CRUSHING AGAINST OBJECTS				806	97	903
Protruding nails	...	...	...	1,164	168	1,332
Other	...	...	...
9. HAND TOOLS (not power-driven or cartridge-operated)	...	...	...	1,278	301	1,579
10. RAIL TRANSPORT	...	...	...	7	69	76
11. NON-RAIL TRANSPORT	...	...	...	995	426	1,421
12. ELECTRICITY	...	...	...	64	25	89
13. OTHER ACCIDENTS	...	...	...	5,237	1,235	6,472
GRAND TOTAL	...	...	...	18,515	3,903	22,418

Reported accidents for the survey area for the period 1st January 1966 to

PROCESS	MACHINERY (POWER AND NON-POWER)				RAIL TRANSPORT	TRANSPORT OTHER THAN RAIL			Fires and explosions of combustible material	Explosions of pressure vessels etc.
	Non-power m/c/y in motion	Power m/c/y being moved without power	M/c/y in motion under power	M/c/y (or relevant part) at rest		Vehicle in motion not moved by power	Vehicle moved by power	Vehicle stationary		
INDUSTRIAL BUILDING										
Construction	1	—	5	1	—	1	1	—	1	—
Maintenance	—	—	—	—	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	—	—	—	—
COMMERCIAL AND PUBLIC BUILDING										
Construction	—	—	3	—	—	—	—	—	—	—
Maintenance	—	—	—	—	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	—	—	—	—
BLOCKS OF FLATS										
Construction	—	—	2	1	—	—	—	—	—	—
Maintenance	—	—	—	—	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	—	—	—	—
DWELLING HOUSES										
Construction	—	—	1	1	—	—	3	1	1	—
Maintenance	—	—	—	—	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	—	—	—	—
OTHER BUILDING OPERATIONS										
Construction	—	—	—	—	—	—	—	—	—	—
Maintenance	—	—	—	—	—	—	—	—	—	—
Demolition	—	—	—	—	—	—	—	—	—	—
Tunnelling, shaft construction etc. ...	—	—	—	—	—	—	—	—	—	—
Dams and reservoirs (other than tunnelling)	—	—	—	—	—	—	—	—	—	—
Bridges and viaducts / aqueducts (other than tunnelling) ...	—	—	—	—	—	—	1	—	—	—
Pipelines and sewers (other than tunnelling)	—	—	1	—	—	—	—	—	—	—
Docks, harbours and inland navigation ...	—	—	—	—	—	—	—	—	—	—
Waterworks and sewage works (other than tunnelling) ...	—	—	—	—	—	—	—	—	—	—
Work on steel and reinforced concrete structures ...	—	—	—	—	—	—	—	—	—	—
Sea defence and river works	—	—	—	—	—	—	—	—	—	—
Work on roads or on airfields	—	—	4	—	—	2	2	1	—	—
Other works	—	—	—	—	—	—	—	—	—	—
TOTAL	1	—	16	3	—	3	7	9	2	—

30th June 1966, analysed by process and primary cause

	Due to electricity	Poisoning and gassing	Use of hand tools	FALLS OF PERSONS				Stepping on or striking against objects or persons	Handling goods (not otherwise specified)	Struck by falling objects	Not otherwise specified	TOTALS	% Distribution	Nat. % Distribution (January to June 1966)
				On or from fixed stairs	On or from ladders	Other falls from one level to another	Falls on same level							
1	—	—	3	—	—	13	10	26	35	11	12	128	47.4	21.2
—	—	—	—	—	—	—	—	—	2	—	—	2	0.7	3.3
—	—	—	—	—	—	—	—	1	—	—	—	1	0.4	1.0
—	—	—	4	—	1	10	5	9	7	3	2	44	16.3	20.2
—	—	—	—	—	—	—	—	—	—	—	—	—	—	4.2
—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.6
—	—	—	—	—	—	2	—	3	5	6	1	21	7.8	6.9
—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.6
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	4	—	3	6	3	3	8	1	2	37	13.7	16.3
—	—	—	—	—	1	1	—	—	2	—	2	6	2.2	4.5
—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.4
—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.5
—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.8
—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.3
—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.6
—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.4
—	—	—	1	—	—	—	—	—	4	1	—	7	2.6	0.8
—	—	—	—	—	—	—	1	—	1	1	1	5	1.9	3.1
—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.8
—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.0
—	—	—	—	—	—	—	—	—	—	—	—	—	—	2.0
—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.4
—	—	—	1	—	—	—	—	1	7	1	—	19	7.0	0.3
—	—	—	—	—	—	—	—	—	—	—	—	—	—	6.9
1	—	—	14	—	5	32	19	43	71	24	20	270	—	—

Reported non-fatal accidents in construction processes for the period

Processes	Machinery					Rail transport	TRANSPORT OTHER THAN RAIL		
	Non-power machinery in motion	Power machinery being moved without power	Machinery in motion under power	Machinery at rest	Vehicle in motion not moved by power		Vehicle moved by power	Vehicle stationary	
BUILDING OPERATIONS									
Industrial building:									
Construction	27	3	344	53	3	68	78	123	
Maintenance	4	—	21	4	—	7	9	12	
Demolition	—	—	22	1	—	1	4	1	
Commercial and Public Building:									
Construction	16	2	300	40	2	66	54	91	
Maintenance	1	—	25	—	—	5	5	9	
Demolition	—	—	6	3	—	—	4	2	
Blocks of flats:									
Construction	4	1	111	14	—	25	24	37	
Maintenance	2	—	2	1	—	1	1	—	
Demolition	—	—	—	—	—	—	—	—	
Dwelling houses:									
Construction	10	4	141	24	—	101	84	105	
Maintenance	5	—	7	—	—	13	2	15	
Demolition	—	—	2	—	—	1	1	2	
Other building operations:									
Construction	2	1	31	6	2	6	6	15	
Maintenance	—	—	5	1	—	2	4	4	
Demolition	—	—	5	1	—	—	2	5	
TOTAL—BUILDING OPERATIONS	71	13	1,032	148	7	296	278	421	
WORKS OF ENGINEERING CONSTRUCTION									
Tunnelling, shaft construction etc.	1	1	45	2	63	3	6	3	
Dams and reservoirs (other than tunnelling)	—	—	14	5	1	2	4	2	
Bridges, viaducts and aqueducts (other than tunnelling)	3	3	29	3	—	3	6	4	
Pipelines and sewers (other than tunnelling)	3	1	69	9	1	7	22	32	
Docks, harbours and inland navigation	—	—	23	4	3	3	2	8	
Waterworks and sewage works (other than tunnelling)	1	—	24	2	—	6	8	11	
Work on steel and reinforced concrete structures	2	—	28	8	1	6	10	16	
Sea defence and river works	—	—	11	2	—	—	3	5	
Work on roads or airfields	1	—	9	—	—	—	5	2	
Other works	8	2	125	14	—	26	108	113	
TOTAL—WORKS OF ENGINEERING CONSTRUCTION	19	7	377	49	69	56	174	196	
TOTAL—ALL CONSTRUCTION PROCESSES	90	20	1,409	197	76	352	452	617	

1st January 1966 to 30th June 1966 for Great Britain analysed by primary cause

Fires and explosions of combustible material	Explosions of pressure vessels etc.	Due to electricity	Poisoning and gassing	Use of hand tools	FALLS OF PERSONS				Striking on or striking against objects or persons	Handling goods (not otherwise specified)	Struck by falling object	Not otherwise specified	TOTAL
					On or from fixed stairs	On or from ladders	Other falls from one level to another	Falls on same level					
26 3 4	8 2 —	23 2 —	3 — —	283 29 13	32 11 1	157 95 9	627 160 54	421 49 13	608 78 19	1,173 151 34	432 54 34	235 36 6	4,748 739 216
24 3 1	4 2 —	16 2 —	— — —	313 61 14	72 15 2	178 133 5	720 162 26	363 53 3	638 85 20	1,055 244 24	366 65 23	203 37 4	4,523 937 177
6 — —	— — —	7 — —	— — —	72 9 1	45 7 —	24 18 1	207 16 4	135 11 —	240 11 2	372 37 1	161 6 2	54 4 —	1,539 126 11
16 3 —	2 — —	9 1 —	— — —	283 100 2	48 29 3	109 151 —	481 134 20	389 71 3	456 83 20	1,006 268 13	231 54 14	148 65 2	3,652 1,001 83
3 — —	— — —	3 — 1	— — —	51 24 8	4 4 1	16 17 1	67 21 8	45 15 1	65 10 6	163 57 12	44 17 7	29 5 —	559 186 58
89	18	64	3	1,278	274	914	3,707	1,572	2,342	4,610	1,530	848	18,515
2 — 1 1 1	1 — 1 1 —	— — 2 4 1	— — — — —	12 12 4 64 8	2 — 1 2 3	2 3 4 8 5	34 11 26 44 20	27 3 15 57 14	23 9 16 64 15	74 14 42 196 50	48 10 17 79 15	12 6 9 34 9	361 96 189 698 184
2 7 — — 9	1 1 — — 2	— 8 1 — 8	1 — — — —	16 29 8 6 142	1 3 1 — 4	3 8 1 3 2	27 51 23 2 65	17 32 3 2 107	21 50 8 4 112	52 121 22 20 326	13 41 9 7 103	14 30 4 2 62	220 452 101 64 1,338
23	7	25	1	304	17	39	393	277	322	1,117	362	182	3,903
112	25	89	4	1,579	291	953	3,010	1,849	2,664	5,727	1,872	1,030	22,418

APPENDIX 11

Reported accidents analysed by trades for the survey area for the period
1st January 1966 to 30th June 1966

CODE NO.	Bricklayer	Plasterer	Steel erector	Scaffoldjack	Demolition worker	Carpenter, joiner	Plumber	Slater, tiler or other roofing worker	Painter	Scaffolder	Labourer (other than tunnelling)	Miner, tunneler or shaftworker (other than vehicle driver)	Vehicle, hoist, crane or excavator driver	Others	Totals
1	—	—	7	—	—	7	—	1	—	5	37	—	5	11	73
2	—	1	9	—	—	1	—	1	—	2	14	—	—	15	43
3	—	—	1	—	—	1	—	—	1	—	2	—	—	2	7
4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5	—	—	—	—	—	1	—	—	—	1	4	—	—	2	8
6	—	—	—	—	—	—	2	—	—	—	3	—	2	1	8
7	1	—	—	—	—	3	1	1	—	2	6	—	1	—	15
8	—	1	—	—	—	2	—	—	—	1	8	—	—	7	19
9	—	—	—	—	—	—	—	—	—	—	8	—	2	—	10
10	—	—	—	—	—	—	—	—	—	—	6	—	6	4	16
11	—	—	—	—	—	—	—	—	—	—	2	—	—	1	3
12	—	—	—	—	—	—	—	—	—	—	2	—	—	—	2
13	6	2	—	—	—	2	2	—	—	1	13	—	—	2	28
14	6	—	—	—	—	4	1	—	2	1	15	—	—	1	30
15	1	—	—	—	—	2	2	—	2	—	1	—	—	—	8
TOTAL ...	14	4	17	—	—	23	8	3	5	13	121	—	16	46	270
SEVERE ...	2	1	2	—	—	3	2	1	1	1	20	—	5	16	54
MODERATE	12	3	15	—	—	20	6	2	4	12	101	—	11	30	216

APPENDIX 12

Reported accidents in construction processes for Great Britain for 1965
analysed according to the occupation of the injured person

Occupation	Reported accidents 1965	Approximate working population	Rate per 1,000 employed
Bricklayer ...	3,150	122,410	25.7
Plasterer ...	666	31,823	20.9
Steel erector ...	1,323	9,654	137.0
Carpenter joiner ...	5,303	190,798	27.8
Plumber ...	1,441	65,886	21.9
Slater, tiler or other roofing worker ...	831	11,776	70.6
Painter ...	2,336	147,461	15.8
Scaffolder ...	1,105	12,593	87.7
Vehicle, hoist, crane or excavator driver ...	1,797	45,048	39.9
Labourer ...	16,833	404,990	41.6
Others ...	9,596	283,935	33.8
Total ...	44,381	1,326,374	33.5

APPENDIX 13

Reported accidents analysed by severity of injury for the survey area for the period 1st January 1966 to 30th June 1966

Code No.	Severe							Moderate							Total		
	Fatalities	Multiple injuries	Amputations	Fractures	Dislocations	Concussion	33 % of burns other than multiple burns	20 % of eye injuries other than burns	Lacerations, Cuts	Abrasions and surface injuries	Bruises	Strains and Sprains	67 % of burns other than multiple burns	80 % of eye injuries other than burns		Sepsis	Other
1	2	—	1	12	2	—	—	—	14	1	18	19	—	4	2	—	73
2	—	—	1	4	—	—	—	—	6	—	11	14	1	2	1	—	43
3	—	—	—	—	1	—	—	—	2	—	2	2	—	—	—	—	7
4	—	—	—	—	—	—	—	—	1	—	3	3	—	—	—	—	8
5	—	—	—	2	—	—	—	—	2	—	1	2	—	—	—	—	8
6	—	—	—	4	—	—	—	—	2	—	4	5	—	1	—	—	15
7	—	—	1	3	—	—	—	—	6	2	3	2	—	—	—	—	19
8	—	—	—	2	—	—	—	—	3	2	2	5	—	—	—	—	10
9	—	—	—	—	—	1	—	—	4	2	2	—	—	—	—	—	16
10	—	—	—	—	—	—	—	—	—	—	2	—	—	—	—	—	3
11	—	—	—	2	—	—	—	—	—	—	4	8	—	—	—	—	2
12	—	—	—	5	—	—	—	—	6	2	6	10	—	1	2	—	28
13	—	—	—	5	1	—	—	—	5	1	9	10	—	—	—	—	30
14	1	1	—	—	—	—	—	—	1	—	3	3	—	—	—	—	8
15	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	—
TOTAL FOR SURVEY AREA	3	1	3	39	5	1	—	2	58	9	61	74	1	8	5	—	270
54 = 20%							216 = 80%										

APPENDIX 14

REPORTED ACCIDENTS ANALYSED BY SITE OF INJURY

For the survey area for the period 1st January 1966—30th June 1966

Site of injury	Building operations	Works of engineering construction
Scalp	10	3
Eye and socket	9	1
Other head injuries	9	—
Spinal column and adjoining muscles	31	7
Trunk (other than spinal column)	22	2
Hand	41	8
Upper limb (other than hand)	15	3
Toes	8	—
Foot (other than toes)	31	2
Lower leg and/or ankle	28	1
Other and multiple lower limb injuries	29	3
Other injuries	6	1
TOTAL	239	31

APPENDIX 15

Reported accidents analysed by length of subsequent absence from work for the survey area for the period 1st January 1966 to 30th June 1966

Code No.	Fatalities	Under 1 Week	1-2 Weeks	2-3 Weeks	3-4 Weeks	4-6 Weeks	6-8 Weeks	8-13 Weeks	Over 13 Weeks	Total
1	—	8	29	13	3	7	7	6	—	73
2	2	4	16	10	6	3	—	2	—	43
3	—	1	4	—	1	—	—	—	1	7
4	—	—	—	—	—	—	—	—	—	—
5	—	1	3	1	1	1	—	1	—	8
6	—	1	4	—	—	2	—	1	—	8
7	—	—	5	4	4	2	—	—	—	15
8	—	12	2	2	—	1	1	—	1	19
9	—	1	3	5	1	—	—	—	—	10
10	—	1	4	4	—	2	3	2	—	16
11	—	1	—	1	1	—	—	—	—	3
12	—	—	—	—	1	—	1	—	—	2
13	—	4	8	8	3	1	2	2	—	28
14	1	2	5	5	3	4	2	3	5	30
15	—	—	2	2	1	3	—	—	—	8
TOTAL for survey area	3	36	85	55	25	26	16	17	7	270
PERCENTAGE OF TOTAL ...	1.1	13.3	31.5	20.4	9.3	9.6	5.9	6.3	2.6	100%

APPENDIX 16

Reported accidents analysed to show severity of injury compared with length of subsequent absence from work for the survey area for 1st January 1966 - 30th June 1966

		Fatalities	Under 1 week	One/two weeks	Two/three weeks	Three/four weeks	Four/six weeks	Six/eight weeks	Eight/thirteen weeks	Over thirteen weeks	TOTAL
SEVERE	Fatalities ...	3	—	—	—	—	—	—	—	—	3
	Multiple injuries ...	—	—	—	—	—	1	—	—	—	1
	Amputations ...	—	—	—	1	1	—	—	1	—	3
	Fractures ...	—	—	4	2	3	10	5	12	3	39
	Dislocations ...	—	—	—	—	1	—	1	1	2	5
	Concussion ...	—	—	—	—	—	—	1	—	—	1
	Burns other than multiple burns ...	—	—	—	—	—	—	—	—	—	—
	Eye injuries other than burns ...	—	—	1	—	1	—	—	—	—	2
Sub-total ...		3	—	5	3	6	11	7	14	5	54
MODERATE	Lacerations and cuts	—	12	21	14	7	1	3	—	—	58
	Abrasions and surface injuries ...	—	—	2	3	1	2	1	—	—	9
	Bruises ...	—	12	19	14	4	7	3	2	—	61
	Strains and Sprains	—	10	31	17	7	4	2	1	2	74
	Burns other than multiple burns ...	—	—	—	—	—	1	—	—	—	1
	Eye injuries other than burns ...	—	1	5	2	—	—	—	—	—	8
	Sepsis ...	—	1	2	2	—	—	—	—	—	5
Sub-total ...		—	36	80	52	19	15	9	3	2	216
TOTAL ...		3	36	85	55	25	26	16	17	7	270

APPENDIX 17

Reported accidents analysed by primary cause and length of subsequent absence from work for the survey area for the period 1st January 1966 to 30th June 1966

Absence	Machinery (Power and Non-power)				Rail Transport			Transport other than Rail			Use of hand tools	Falls or Passes				Stepping on or striking against objects or persons	Handling goods (not otherwise specified)	Struck by falling object	Not otherwise specified	Total
	Non-power machinery in motion	Power machinery being moved	Machinery in motion under power	Machinery (or relevant part) at rest	Vehicle in motion not moved by power	Vehicle moved by power	Vehicle stationary	Fires and explosions of combustible material	Explosions of pressure vessels etc.	Due to electricity	Poisoning and gassing	On or from fixed stairs	On or from ladders	Other falls from one level to another	Falls on same level					
Fatalities	1	...	...	...	...	...	1	1	...	...	...	...	...	3
Under 1 week	2	...	...	1	1	...	...	1	...	...	...	4	5	10	4	3	4	36
1-2 weeks	4	...	1	1	1	1	...	...	...	...	2	8	3	15	28	7	8	85
2-3 weeks	5	...	1	...	2	...	...	...	...	...	...	5	4	9	13	6	5	55
3-4 weeks	1	...	...	1	...	...	...	...	...	...	1	2	2	4	7	2	2	25
4-6 weeks	3	...	...	...	1	1	...	...	...	...	...	2	3	2	9	3	...	26
6-8 weeks ...	1	...	...	...	...	2	2	...	...	...	...	...	...	2	...	2	6	1	...	16
8-13 weeks	1	...	...	2	...	...	...	...	...	...	...	7	2	1	3	1	...	17
Over 13 weeks	1	...	...	...	...	...	1	1	...	...	...	1	1	7
TOTAL ...	1	...	16	3	3	7	9	2	...	1	...	...	5	32	19	43	71	24	20	270

APPENDIX 18

Reported accidents analysed by age of injured person for the survey area
for the period 1st January 1966 to 30th June 1966

Code No.	Under 18	18-21 years	22-30 years	31-40 years	41-50 years	51-60 years	Over 60	Total
1	—	5	25	22	16	4	1	73
2	—	1	16	10	11	5	—	43
3	—	—	1	—	5	1	—	7
4	—	—	—	—	—	—	—	—
5	—	—	1	4	2	1	—	8
6	1	—	2	4	1	—	—	8
7	1	—	4	6	3	1	—	15
8	—	2	6	6	3	1	1	19
9	—	2	3	2	2	1	—	10
10	1	5	3	3	4	—	—	16
11	—	—	2	—	1	—	—	3
12	—	1	—	1	—	—	—	2
13	5	2	5	6	7	3	—	28
14	1	6	7	7	4	4	1	30
15	—	1	—	3	2	2	—	8
TOTAL for survey area	9	25	75	74	61	23	3	270
PERCENTAGE OF TOTAL ...	3.3	9.3	27.8	27.4	22.6	8.5	1.1	100%

APPENDIX 19

Reported accidents for the survey area for the period 1st January 1966 to 30th June 1966
 Analysed to show length of subsequent absence from work compared with age of injured person

	Fatalities	Under 1 week	1-2 weeks	2-3 weeks	3-4 weeks	4-6 weeks	6-8 weeks	8-13 weeks	Over 13 weeks	Total (Percentage)
Under 18 ...	—	2 (5.5)	4 (4.7)	1 (1.8)	—	—	1 (6.2)	1 (5.9)	—	9 (3.3)
18-21 years	—	5 (13.9)	7 (8.2)	5 (9.1)	4 (16)	2 (7.7)	2 (12.5)	—	—	25 (9.3)
22-30 years	—	13 (36.1)	23 (27.1)	14 (25.5)	6 (24)	7 (26.9)	5 (31.3)	5 (29.4)	2 (28.6)	75 (27.8)
31-40 years	—	7 (19.4)	24 (28.2)	18 (32.7)	9 (36)	6 (23.1)	3 (18.8)	5 (29.4)	2 (28.6)	74 (27.4)
41-50 years	2 (66.6)	8 (22.2)	20 (23.5)	12 (21.8)	4 (16)	6 (23.1)	3 (18.8)	4 (23.5)	2 (28.6)	61 (22.6)
51-60 years	1 (33.3)	1 (2.8)	6 (7.1)	4 (7.3)	2 (8)	5 (19.2)	2 (12.5)	2 (11.8)	—	23 (8.5)
Over 60 years	—	—	1 (1.2)	1 (1.8)	—	—	—	—	1 (14.2)	3 (1.1)
	3 (100)	36 (100)	85 (100)	55 (100)	25 (100)	26 (100)	16 (100)	17 (100)	7 (100)	270 (100)

Note: Percentages are shown in brackets.

APPENDIX 20

Reported accidents for the survey area from 1st January 1966—30th June 1966 analysed by experience of injured person

Code No.	Under 1 week	1-2 weeks	2-3 weeks	3-4 weeks	1-2 months	2-3 months	3-6 months	6-12 months	1-2 years	Over 2 years	Total
1	3	2	2	4	7	9	13	12	9	12	73
2	—	—	—	2	2	1	3	5	15	15	43
3	—	1	—	1	—	—	—	2	1	2	7
4	—	—	—	—	—	—	—	—	—	—	—
5	—	1	1	—	1	1	1	1	—	2	8
6	—	1	—	2	—	—	—	—	—	5	8
7	1	—	—	—	—	—	3	5	5	—	15
8	2	2	1	1	1	1	4	2	1	4	19
9	1	—	1	—	1	3	1	1	—	2	10
10	2	2	1	1	2	2	3	3	—	—	16
11	—	—	—	—	—	1	1	—	1	—	3
12	2	—	—	—	—	—	—	—	—	—	2
13	—	—	—	—	1	1	4	2	3	17	28
14	—	3	—	—	2	1	2	2	6	14	30
15	—	—	—	—	—	—	—	1	—	7	8
TOTAL ...	11	12	6	11	17	21	35	36	41	80	270
Percentage of total accidents	4.1	4.4	2.2	4.1	6.3	7.8	13.0	13.3	15.2	29.6	100
Percentage up to 3 months	28.9										

APPENDIX 21

Regulations 5 and 6 of the Construction (General Provisions) Regulations 1961

SUPERVISION OF SAFE CONDUCT OF WORK

Appointment of safety supervisors

5 (1) Every contractor, and every employer of workmen, who undertakes operations or works to which these Regulations apply and who normally employs more than twenty persons thereon at any one time (whether or not all those persons are employed on the same site or are all at work at any one time) shall specifically appoint in writing one or more persons experienced in such operations or works and suitably qualified for the purpose to be specially charged with the duties:

- (a) of advising the contractor or employer as to the observance of the requirements for the safety or protection of persons employed imposed by or under the Factories Acts 1937 to 1959, or the Lead Paint (Protection against Poisoning) Act 1926, and as to other safety matters; and
- (b) of exercising a general supervision of the observance of the aforesaid requirements and of promoting the safe conduct of the work generally.

(2) The name of every person so appointed shall be entered by the contractor or employer appointing him on the copy or abstract either of these Regulations or of the Factories Acts 1937 to 1959, required to be posted up in accordance with sections 114 or 115 and 107 or 108 of the Factories Act 1937.

Other duties and joint appointments of safety supervisors

6 (1) The duties assigned to any person appointed under the preceding regulation by the contractor or employer appointing him, including any duties other than those mentioned in that regulation, shall not be such as to prevent that person from discharging with reasonable efficiency the duties assigned to him under that regulation.

(2) Nothing in these Regulations shall be construed as preventing the same person or persons being appointed for a group of sites or as preventing two or more contractors or employers from jointly appointing the same person or persons.

